Specialized Oil Publications of
THE GULF PUBLISHING COMPANY

The OIL WEEKLY and The COMPOSITE CATALOG for the drilling-producing-pipeline industry

PETROLEUM REFINER and The REFINERY CATALOG for the refining-natural gasoline industry

LOOKING AHEAD
... with the Editor

DESPITE handicaps of wartime equipment troubles and the fact that it was commenced as a normal routine operation, Phillips Petroleum Company's Ada Price 1, Pecos County, West Texas, has succeeded in attaining a world depth record. Last week the test had reached 15,255 feet, 251 feet deeper than any well in the world.

The story of this remarkable achievement, profusely illustrated with pictures of the machinery, will be featured next week.

THE OIL MAN'S CALENDAR

APRIL 24-25	National Oil Scouts and Landman's Association, Dallas.
27-29	Independent Petroleum Association of America, Bradford, Pa.
MAY 8-10	Regional Meeting, American Institute of Mining and Metallurgical Engineers and Spring Meeting Petroleum Division, Houston.
8-10	National Oil and Gas Power Conference (Oil and Gas Division, Power Division) ASME, Tulsa.
11-13	A. G. A., Natural Gas Department, Spring Conference, French Lick, Ind.
25-26	Spring Meeting, Mid-Continent District, API, Division of Production, Mayo Hotel, Tulsa.
JUNE 13-14	Spring Meeting, Southwestern District, API, Division of Production, Rice Hotel, Houston.
OCT. 12-13	Texas Mid-Continent Oil & Gas Association, Houston.
NOV. 13-16	American Petroleum Institute, Stevens Hotel, Chicago.

THE OIL WEEKLY

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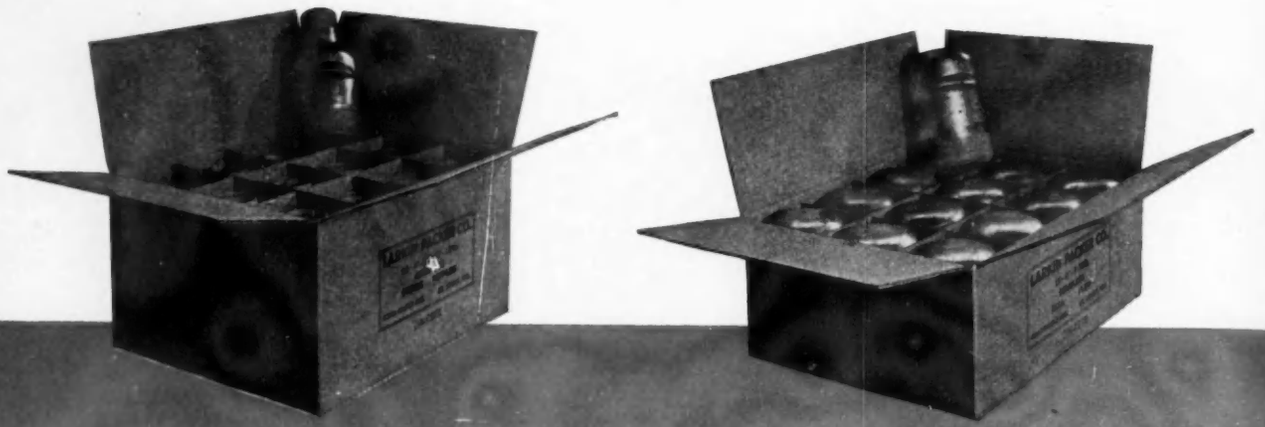

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The Changing Panorama

U. S. Middle East Oil Holdings at Issue

THE AMERICAN petroleum industry may well be concerned over the eventual outcome of the discussions now in progress in Washington between representatives of Great Britain and the United States. It is quite probable that the discussions will result in decisions which will have a permanent effect on the world petroleum situation, perhaps leading to cartel or compact arrangements that will drawf anything previously negotiated along this line. It is almost certain that some sort of understanding will be arrived at involving much of the world's postwar oil supply.

Plans of Petroleum Reserves Corporation to construct an Arabian pipe line very likely forced the issue at this time. The fact that the British mission came to this country, and the fact that the United States already has the Arabian and Bahrein concessions, indicates the British are here to protest and for the purpose of getting a share in the program. Some oil men expect the British to seek to apply an open-door policy in an effort to obtain a share in the Arabian and Bahrein oil holdings of American nationals. Those expecting this to happen argue that the holdings of American companies in Iraq and Kuwait were obtained in this fashion, so the British are not likely to overlook a chance to reverse the process. The attitude of Great Britain on the proposed pipe line is not known, but because the development of a large producing capacity in Arabia, Kuwait and Bahrein connected by pipe line with the Mediterranean would have a profound influence on British operations in Iraq and Iran they are certain to have some plans affecting the pipe line.

These circumstances, plus the British reputation as super-international traders, and plus the fact they have sent into the game a team that includes high ranking oil men whereas United States oil-industry representatives are confined to "advisors" who do not sit in on the actual negotiations.

As a result of corrosion tests, beryllium now moves alongside molybdenum as an oil-field material. Springs made from beryllium copper have been found to stand conditions simulating those down-the-hole in sour crude with minimum loss, and without loss of resilience.

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Postwar Petroleum Uses on the Farm

FARMERS, already one of the big oil-consuming markets, promise to become even more important users of petroleum products when peace comes. Scores of new labor- and time-saving machines will make their appearance after the war. Some of these will be big, clumsy units powered by heavy engines, others will be tractor-powered, while others will use small gasoline engines.

In the books are machines for harvesting beets, potatoes, sugar cane, picking cotton and corn, baling hay and many others. How far this farm revolution may go depends on farm wage and income scales.

Cycling Operations

FOUR cycling plants in Louisiana processed 92,200 million cubic feet of gas during 1943, recovering 4½ million barrels of liquid products and returned 64,400 million cubic feet of residue gas to the reservoirs. Currently, these plants are processing 260 million cubic feet of gas and extracting 13,000 barrels of products per day. When an additional plant reaches capacity operation shortly, the amount of liquid products by cycling plants in Louisiana should be increased to about 30,000 barrels daily.

While this is a relatively small amount compared with the state's daily oil production of 360,000 barrels, it is, however, a valuable addition, especially since a large part goes directly into products used in the war.

Another Shot at 1953's Automobile

PREDICTING postwar developments of one thing or another is one of America's favorite indoor sports these days. Airplanes, automobiles and the radio have been especially popular topics.

Here's one more for the collection. The speaker is in good position to forecast and has the added virtue of admitting in advance that such a practice is a bit dangerous. Dr. C. H. Schlesman, in charge of the research and development division of the general laboratories of Socony-Vacuum Oil Company, Paulsboro, N. J., lists these points for the 1953 automobile:

Use of alloy steels, aluminum and plastics will keep the car light in weight but with great rigidity with the virtual elimination of the frame.

Engine will allow sustained speeds of 60 miles an hour but lower wind resisitance in body design will require engines to develop only 35 horsepower at such speed. At the same time they will run economically at the average city traffic speed of 30 m.p.h. High horsepower engines that today utilize only 12 percent of their available power at the 35 m.p.h. war speed will disappear.

Mechanical improvements and good gasoline will combine to permit an engine that will have twice the mileage of today's car on a gallon of fuel.

Additional fuel will be saved by increasing ratio of the high speed, small-cylinder engine, this without exceeding 90-octane number in 1953 fuel.

PAW Authorized to Endorse Deferment

PAW has now been authorized to endorse special requests for deferment of key men under 26 years of age engaged in production of oil or gas, including exploration, development and service, according to a telegram received by W. M. Averill, District 3 director, from D. R. Knowlton, Director of Production, PAW, Washington.

Operators should make every attempt to get three copies 42-A (Special) Forms into Labor Counselor's Office, PAW, Washington, within next day or two.

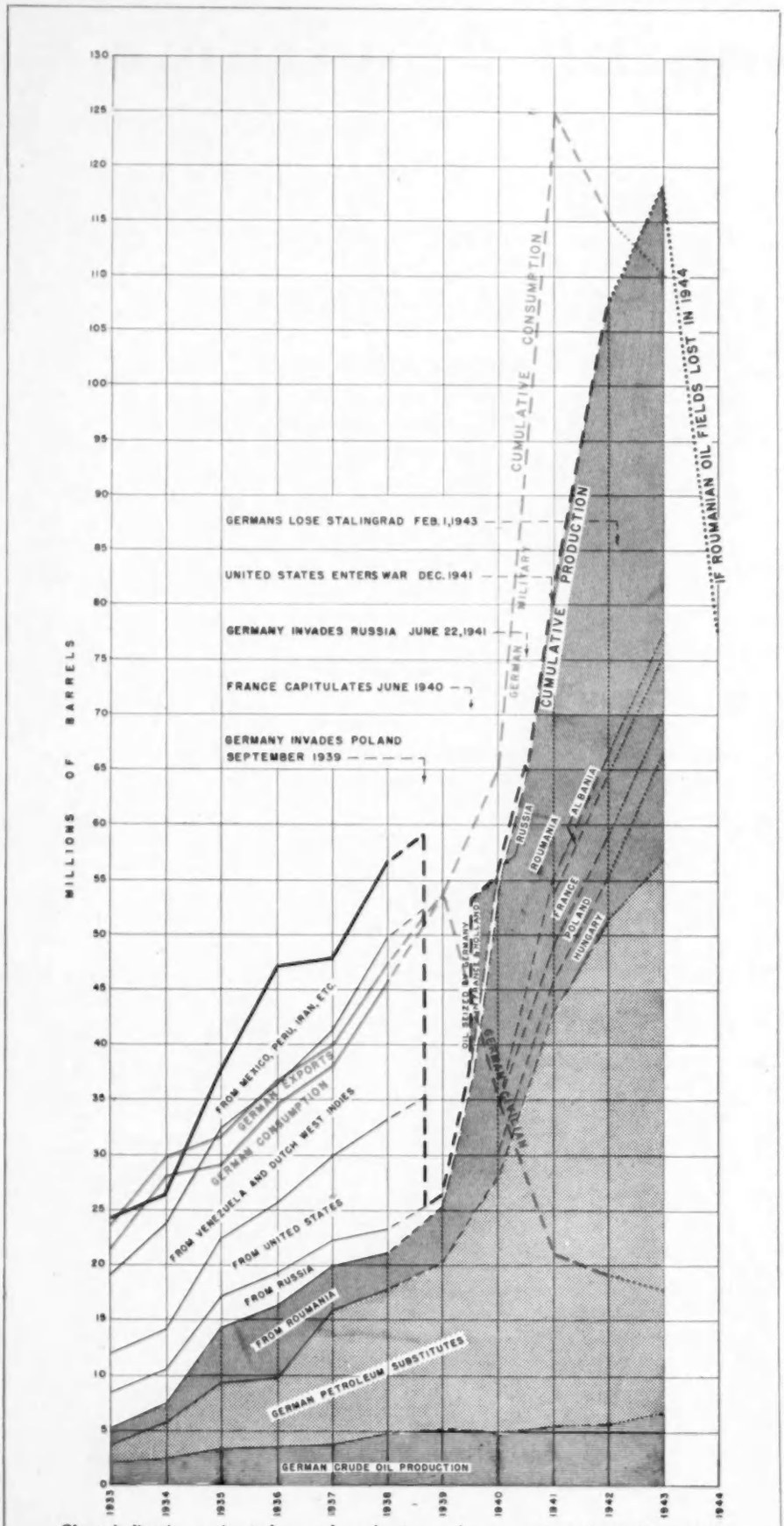


Chart indicating estimated annual production and consumption of petroleum products available to Germany from 1933 to 1944. Solid lines show data from published statistics, dashed lines show data based on expert opinion, the dotted lines indicate possibilities.

Data collected and compiled by author and Pierre Bayle, geophysicist, Houston.

Germany

NO problem is more vexatious or creates a greater feeling of impotence than to have some place to go and no gasoline with which to get there. To an individual this is an inconvenience and a worry, to a community it is a matter of serious concern, but to a nation it is a calamity. In this day of mechanized warfare, no one thing or circumstance must give the German high command a greater headache than the mere possibility that they may one day be unable to proceed, that they may be "out of gas."

The Russian drive toward the Roumanian oil fields brings into sharp relief the impending crisis the loss of these fields would mean to Germany. A careful analysis of published data reveals that well over one third of the oil for the German war effort comes from the Ploesti district, 36 miles north of Bucharest, in Roumania. If the Germans hope to retain the power to wage offensive war, they must fight for and hold these valuable oil wells.

On the German home front the battle for oil is waged in two sectors, the search for and development of crude oil in the ground, and the making of synthetic products, principally gasoline. Of the two, at the present time, synthetics contribute over 45,000,000 barrels annually, or nearly 50 percent of the total oil income, and crude oil less than 7,000,000 barrels annually, or less than 8 percent of the whole. The accompanying chart attempts to set out the growth and composition and use of German oil production annually from 1933 to the present year.

To arrive at some understanding of the present German oil situation, it is well to consider its development since January, 1933. This is the year of the "Machtubernahme," the year of the taking over of power (by the Nazis). Everything dates either before or after this date. In the 1939-40 edition of "The Yearbook of the German Oil Industry," assembled by K. H. v. Thumen, the oil history of Germany is divided into three stages, the first from its inception to January, 1933, the second from that date to October 20, 1936, and third, from that date to the present. On this important date, October 20, 1936, General Field Marshal Goering was placed at the head of the German petroleum industry and made leader of

☆

Following a tour of the German oil fields during the summer of 1933, Dr. Eby prepared two comprehensive articles on Germany's oil development, which were published in *The Oil Weekly* of October 2, 1933, and February 5, 1934. In addition to reviewing the geology of the area and data on producing regions, these studies included an alphabetical list of the known salt domes and structures, giving locations and pertinent comments. This list was illustrated by a large-scale map of the region.

The present article comments on Germany's trend of available oil supplies, consumption, development of synthetic fuels, and presents information on oil fields discovered within Germany proper since 1933.

Fights for Oil

Battle for petroleum is waged on the battle fronts and on the home front

By DR. J. BRIAN EBY
Consulting Geologist, Houston, Texas

a four-year plan for self-sufficiency in oil. Could the Germans have copied a leaf from the Bolshevik notebook in proposing a four-year plan? However desirable these self-appointed stages in German petroleum history serve the Reich, this much is certain, if the Roumanian oil fields are lost this time, a fourth stage will have arrived.

Production and Consumption

The purpose of the chart is an endeavor to show the relation between Germany's available oil and her oil expenditures. Prior to 1939 the figures of both production and consumption are taken from Thumen's tables, and for the record the tables are given herewith, but converted from European tons to American barrels, on the basis of 7½ barrels per ton* for gasoline. From 1939 all figures are estimated, and should be treated as such. Estimates of total German wartime consumption of petroleum and its products are compiled from various reports, largely from data given by Fredborg, the Swedish correspondent, in his book "Behind the Steel Wall." Fredborg was expelled from Berlin in the summer of 1943.

Considering the oil chart, the period from 1933 to 1939 was dominated by intensive increase in imports. For many years prior to 1933 the lines of total oil income and consumption approximately balanced. The same was true for 1933 and 1934. In the year 1935, imports skyrocketed and continued to rise to September, 1939, the outbreak of the war. From 1935 to 1939, inclusive, a five-year period, the annual reserve for storage ranged from 5 to 10 million barrels. Imports from the United States, the British and Dutch possessions, increased progressively. Imports from Russia during the same interval steadily decreased and continued to decrease even after the German-Russian treaty of August, 1939. On the basis of these figures alone it would appear that as early as 1935 both Germany and Russia, having diagnosed the trend of coming events, proceeded to act accordingly.

With the outbreak of the war, the rapid German development of synthetic gasoline from hard and soft coal, from gas, alcohol, and vegetable matter, proceeded at phenomenal rate. As indicated in the diagram, it probably exceeded 46,000,000 barrels a year for the year of 1943. The chart, however, makes no provision for losses due to Allied bombing of synthetic plants as this information is not available. Nevertheless, that the Nazis figured on taking over the Roumanian oil fields (see map of these fields) from the start, goes without saying.

Using Reserve Oil

From the outbreak of the war in 1939 until June 22, 1941, the German war machine was using up oil faster than it was being acquired, in other words, using reserve oil. Fredborg estimates that for a full 12 months of offensive warfare the German armed forces would require 165,000,000 barrels. This is a far greater quantity than Germany, Hungary, Poland, Austria, Albania and Roumania together could possibly produce. In spite of the treaty of "friendship" of August, 1939, Russia was refusing to export oil to Germany in sizable quantity. There were only two sources of oil satisfactory to the German war effort within reasonable hope of attainment, the Russian fields and the fields of the Near East. On June 22, 1941, the drive for the Russian fields of the Baku region started (see map of Russia and its oil fields).

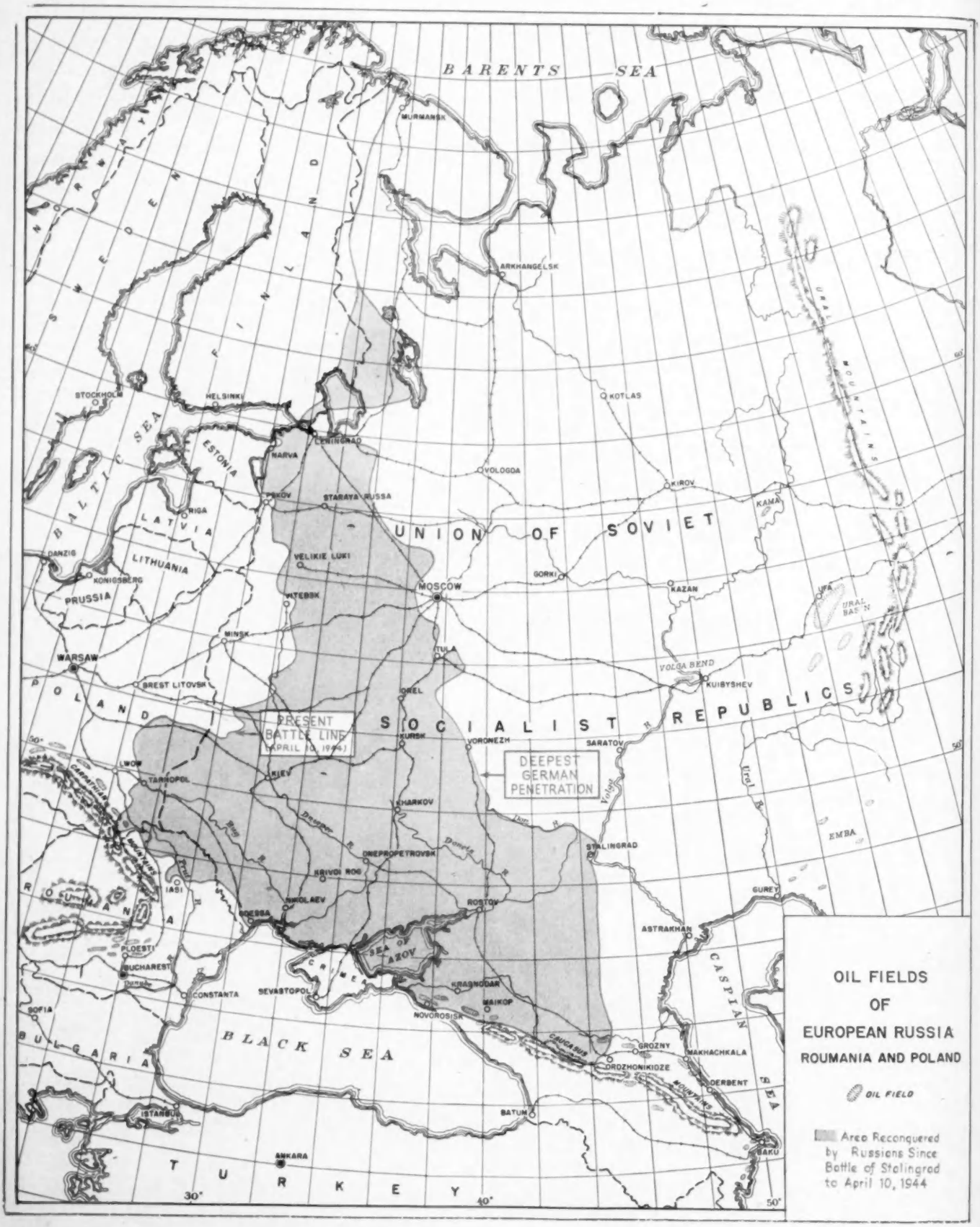
The attack on Russia had two major purposes, first, the encompassing and destruction of the Red armies, and second, the seizure and use of all of its agriculture and minerals, of which oil was unquestionably one of the predominantly important. The failure of the first objective, in the summer of 1941 before Moscow, led to bitter disappointment and disillusionment in the Reich. In the summer of 1942, however, a second and final all-out attempt under von Bock was made to reach the Baku fields. At the same time, July 1, 1942, Rommel reached El Alamein, within sight of Alexandria, Egypt, and hopefully within reach of the oil fields of the Near East (see map). Had these two generals been

Map compiled by author with assistance of Hubert Guyod, Houston, who spent the years of 1933, 1934 and 1938 in the oilfields of North Germany.

* Some correction has been used to compensate for differences in gravity. Fuel oils, for example, on the basis of 7 barrels per ton, and crude oil on the basis of 7.36 barrels per ton.

successful in uniting their armies in the Near East, Turkey would have fallen to the Axis, and about 50 percent of the total oil reserves of the world would have been in German hands. How these two great drives failed is well known. However great the loss of life, equipment and morale to the Germans in these two defeats, they were nothing compared with their loss of any possibility of reaching a wartime self-sufficiency in oil.

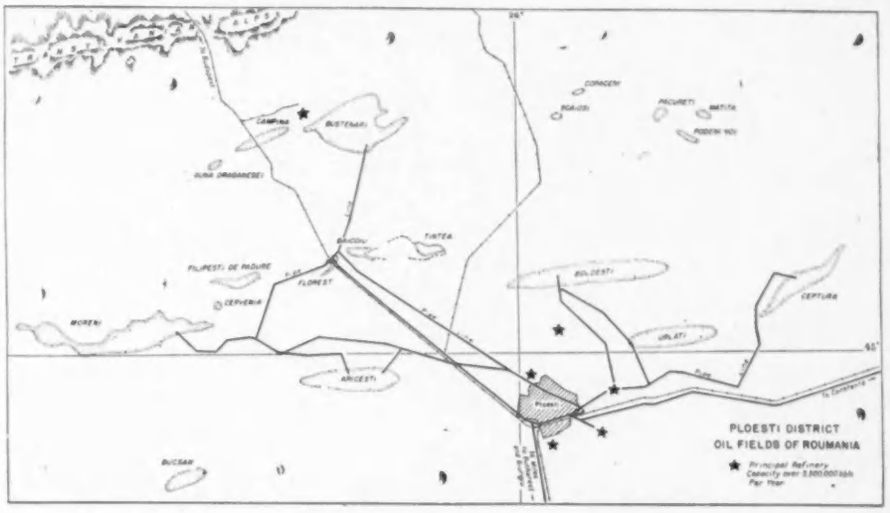
At the height of the Caucasus invasion (see Russian map) the Maikop oil fields fell into German hands September, 1942.



This map of European Russia and neighboring countries shows the maximum German penetration of Russia (September, 1942) and its relation to the oil producing areas of the Caucasus. It also shows the present approach of the Russian army to the Roumanian oil fields.

Oil from this district had been estimated at 27,000,000 barrels annually but the Russians had thoroughly scorched the wells and equipment. With typical German efficiency, a civilian commission of 40 oil experts immediately followed the army in occupation of the fields. Within a few days, according to Fredborg, all 40 were found dead in their sleeping quarters, the victims of partisans. Such was the thoroughness of Russian sabotage in the lost oil fields. It is doubtful if in the few months of occupancy the Germans succeeded in getting any helpful quantity of oil from these fields.

Further to the southeast of Maikop the German advance line actually overran one and probably two of the fields of the Grozny district. They definitely occupied the Malgabek field, a minor field in the Grozny area, but here again its nearness to the battle line made its occupation of doubtful value.

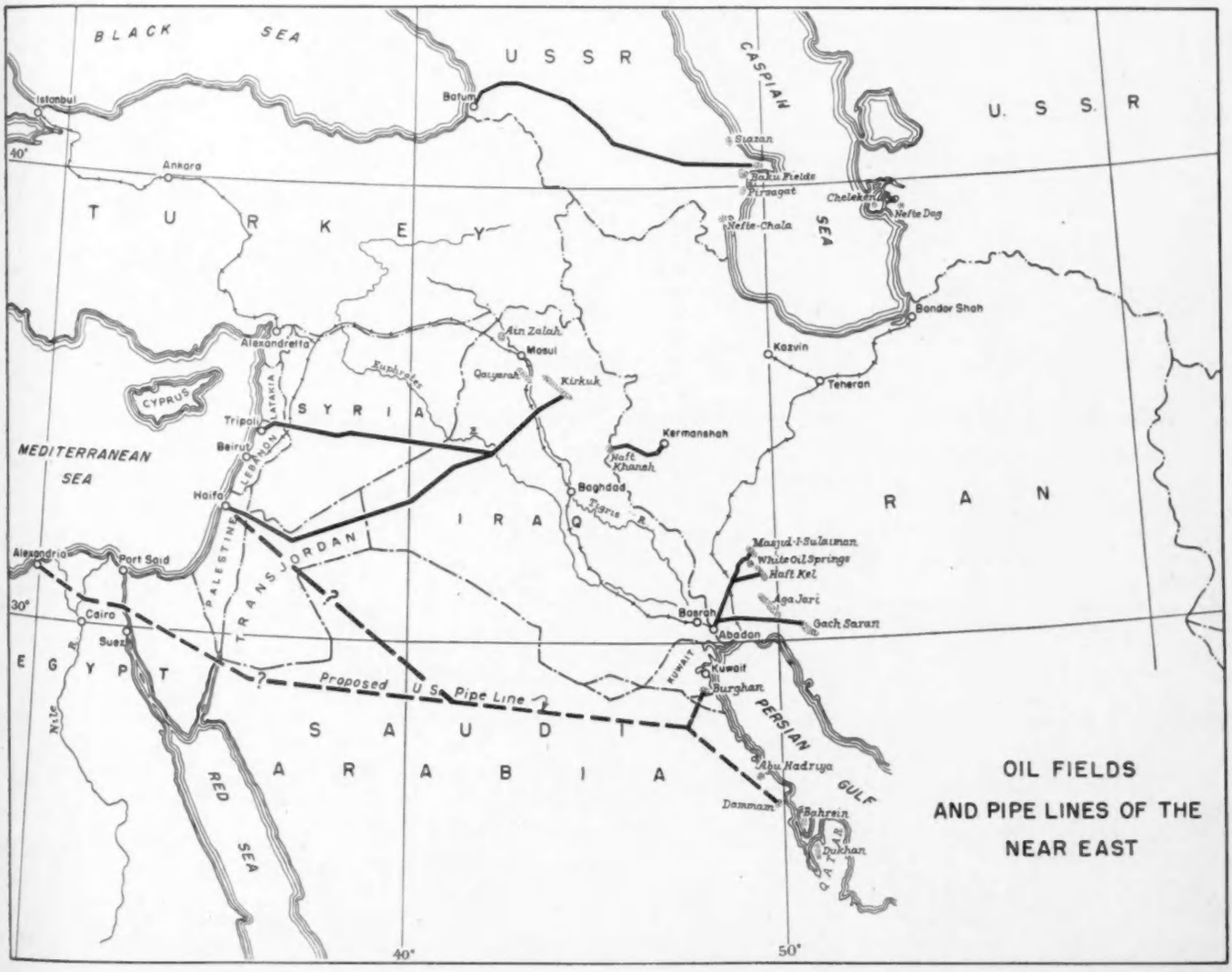


Drilling Spurts

On the home front, drilling for crude oil was carried out extensively in the Hannover basin (see map of North German oil fields). The four old fields, Neinhagen, Wietze, Olheim, and Oberg, came in for new drilling and the first field produced a notable extension. Following the outbreak of the war figures of production are only estimates and grouped under total production figures. Thumen reports new fields or valuable prospects at Steimbke, Broistedt, Adolfs-Gluck, Sottorf, Tegernsee, Eicklingen-Sandlingen, Reitbrook, Worms and Meckelfeld. Most of these are in the North German plain area and those that could be located are shown on the map. The Heide field, in the Province of Holstein, is producing gas. Of all the places listed, the Reitbrook field near Hamburg is probably the best of the lot. Up to 1939, however, Thumen speaks more of promise than performance. Of synthetics, he says next to nothing.

A number of new discoveries or fields are mentioned in an article which appeared in the "Petroleum Zeitschrift," by Professor W. Haack, in the February 1, 1939 issue. A very small scale map was included, showing location of both new and old fields. In addition to those mentioned by Thumen, Professor Haack called attention to discoveries at Molme, Fallersleben, Rodenwald and Fallstein, all of which are located on the accompanying North German Basin map.

A brief article on synthetic gasoline



from the high-pressure hydrogenation of hard coal appeared in the July 10, 1938, issue of the "Umschau," a German technical magazine. The author, Dr. E. H. M. Pier, pointed out that by this method, in 1937, nearly 6,750,000 barrels of gasoline were made, or about 90 percent of all German synthetic gasoline production for that year. What has happened to the German synthetic-gasoline business since the beginning of the war, and even before, has been one of its closest secrets. The figures used in this chart for the war period are those given by Garfias, Whetzel and Ristori in "Petroleum Development and Technology," American Institute of Mining and Metallurgical Engineers. There is a probability that it is much greater. The figures for 1943 are estimates, little better than guesses.

In considering the various data and estimates herein quoted, one discrepancy appears to stand out. Fredborg's figures of 112,000,000 barrels annually, or over 300,000 barrels daily, for defensive war, and 165,000,000 barrels annually, or about 450,000 barrels a day for offensive war, seem entirely at variance with any figures of oil available to Germany. How has Germany been able to do it? Either Fredborg's figures are too high, or German production of oil from all sources is far greater than the available data would indicate.

Another factor to bear in mind is that, within every calendar year since the war started, there have been relatively inactive periods, the "phony" war of 1940, the spring and early summer quiet before the attack on Russia in 1941, and comparatively quiet periods in 1942 and

■ CONTINUED ON PAGE 54

TABLE 1

German Crude Oil Production

(in thousands of barrels)

FROM:	1933	1934	1935	1936	1937	1938	1939	1940	1941	1942
Nienhagen	1,086	1,800	2,480	2,500	3,590	2,682	.....	.....	.....	.....
Wietze	404	389	377	351	336	326	.....	.....	.....	.....
Oberg	117	99	209	173	161	127	.....	.....	.....	.....
Austria	.....	.....	.....	.....	.....	425	.....	.....	.....	.....
Others	180	67	150	310	312	1,000	.....	.....	.....	.....
Total Germany	1,787	2,355	3,216	3,334	3,399	4,560	5,000	4,544	5,240	5,400
Austria	6	31	50	56	248	.....	.....	.....	.....	.....
Total	1,793	2,386	3,266	3,390	3,647	4,560	5,000	4,544	5,240	5,400

TABLE 2

Imports of Petroleum Products into Germany

(in thousands of barrels)

FROM:	1933	1934	1935	1936	1937	1938
United States	3,410	3,250	5,050	6,070	7,400	8,760
Venezuela	7,050	9,500	9,910	10,860	11,250	16,500
Roumania	1,375	1,870	5,080	6,630	3,920	3,310
Mexico	2,100	1,990	2,360	2,850	2,590	3,200
Iran	1,165	1,225	390	5,890	1,090	1,485
U. S. S. R.	3,160	2,910	2,970	2,360	2,220	590
Peru	1,030	1,315	595	595	1,105	960
Other countries	1,010	1,290	2,290	1,560	1,800	2,200
Total	20,300	20,330	28,645	36,815	31,375	37,005
Less Exports	2,050	1,695	2,620	2,140	1,720	1,535
Net excess Imports over Exports	18,250	18,635	26,025	34,675	29,655	35,470

TABLE 3

German Consumption of Petroleum Products

(in thousands of barrels)

PRODUCTS	1933	1934	1935	1936	1937	1938
Gasoline	10,800	12,700	14,200	16,400	18,300	21,850
Diesel Oil	3,850	4,830	6,475	8,400	9,450	11,550
Kerosene	840	895	860	840	750	750
Lubricating Oil	1,820	2,275	2,870	3,080	3,500	3,850
Fuel Oil	3,850	4,050	4,200	5,250	5,450	7,175
Total	21,160	24,750	28,605	33,970	37,450	45,175

TABLE 4

German Production of Petroleum Products from Domestic and Imported Crudes

(in thousands of barrels)

PRODUCT	1933	1934	1935	1936	1937	1938
Gasoline (all types)	2,210	2,780	4,320	6,590	9,450	?
Kerosene	157	212	380	408	563	.....
Fuel Oil	1,540	1,690	2,670	3,140	3,380	.....
Lubricating Oil	888	1,182	1,444	1,880	2,380	.....
Total	4,795	5,864	8,814	12,018	15,773	.....

Data for Tables 1, 2, 3 and 4 from K. H. v. Thumen, "Yearbook of German Oil Industry."

TABLE 6

World Crude Production and Reserves

(in thousands of barrels)

COUNTRY	Crude Production During 1943		Crude Reserves End of 1943	
	Amount	Percent	Amount	Percent
North America	1,546,850	68.0	20,832,793	40.9
The United States	1,502,000	66.1	20,082,793	39.6
Mexico	34,900	1.5	600,000	1.0
Canada	9,950	0.4	150,000	0.3
Europe	299,660	13.2	6,354,900	12.5
U. S. S. R.	240,000	10.5	5,735,000	11.3
Roumania	42,000	1.8	392,000	0.8
Germany-Austria	7,300	0.3	68,700	0.1
Poland	3,500	0.1	30,000	0.0
France	600	0.0	11,000	0.0
Italy	35	0.0	1,000	0.0
Albania	1,100	0.0	41,000	0.1
Hungary	5,000	0.2	75,000	0.1
Czechoslovakia	125	0.0	1,200	0.0
South America	265,540	11.	6,734,000	13.3
Venezuela	187,000	8.2	5,600,000	11.0
Colombia	13,750	0.6	500,000	1.0
Trinidad	25,000	1.1	239,600	0.5
Argentina	23,500	1.0	168,000	0.3
Peru	14,000	0.6	135,000	0.3
Ecuador	2,000	0.1	45,000	0.1
Bolivia	250	0.0	45,400	0.1
Brazil	40	0.0	1,000	0.0
Near East	116,000	5.1	15,500,000	30.5
Iran	78,000	3.4	6,000,000	9.8
Iraq	23,500	1.0	4,000,000	7.9
Kuwait	.....	....	.....	....
Saudi-Arabia-Bahrein	14,500	0.6	2,000,000	3.9
Qatar	.....	....	500,000	1.0
Far East	30,500	1.3	1,153,400	2.2
India-Burma	4,000	0.2	167,400	0.3
Japan	3,500	0.1	36,000	0.1
Netherland Indies	23,000	1.0	950,000	1.8
Africa	8,500	0.4	86,000	0.2
Egypt	8,500	0.4	86,000	0.2
Others	5,000	0.2	41,500	0.1
World Total	2,282,050	....	50,702,593	....

Crude production figures from The Oil Weekly. Reserves figures from PAW report filed Feb., 1944, with Truman Congressional Investigating Committee.

TABLE 5

Production of Petroleum and Its Substitutes in Europe

(in thousands of barrels)

	Germany			Roumania			France			Poland			Hungary			Italy-Albania		
	Crude	Substitute	Total	Crude	Substitute	Total	Crude	Substitute	Total	Crude	Substitute	Total	Crude	Substitute	Total	Crude	Substitute	Total
1935	3,054	5,900	8,954	61,150	900	62,050	.....	.....	.....	3,973	500	4,473	.....	.....	.....	.....	.....	.....
1936	3,100	6,200	9,300	64,000	1,000	65,000	.....	.....	.....	3,800	500	4,300	.....	.....	.....	.....	.....	.....
1937	3,180	12,140	15,320	52,180	800	52,980	.....	.....	.....	3,710	150	3,860	.....	.....	.....	.....	.....	.....
1938	4,300	13,000	17,300	48,500	700	49,200	.....	.....	.....	3,820	150	3,970	.....	.....	.....	.....	.....	.....
1939	5,000	15,000	20,000	46,000	800	46,800	500	3,498	3,998	3,850	150	4,000	1,100	80	1,180	934	.....	934
1940	4,544	23,000	27,544	43,231	2,500	45,731	496	3,500	3,996	3,891	150	4,041	1,755	100	1,855	1,659	.....	1,659
1941	5,240	32,000	37,240	40,500	2,000	42,500	500	4,100	4,600	3,310	200	3,510	2,600	100	2,700	1,200	300	1,500
1942	5,400	46,000	51,400	41,000	2,000	43,000	500	4,800	5,300	3,400	300	3,700	3,800	200	4,000	1,500	400	1,900

From V. R. Garfias, R. V. Whetzel, and J. W. Ristori in "Petroleum Development and Technology, A. I. M. E.

Effect of Physical Properties of Oil Reservoirs on Flow Performance

Data needed by operator to make applications to various problems listed

By E. N. KEMLER
Professor of Mechanical Engineering, Purdue University

No. 2 of a Series

HE first article of this series considered the physical characteristics of an oil reservoir of importance in reservoir flow performance. The application of these properties to the performance of the reservoir and the prediction of its future behavior is very difficult and requires careful study and analysis. Most reservoir problems cannot be solved with any one set of data. They require a combination of physical properties and well performance history.

The general study of reservoir problems requires a knowledge of flow characteristics of the reservoir. With a proper understanding of these characteristics and a history of a well's performance as expressed in engineering data it is possible to make many practical applications to reservoir problems. The following discussion will consider the more important flow characteristics as they influence the producing characteristics of a reservoir or well.

Some ideas as to the general behavior of reservoirs as a unit is necessary if bottom hole pressure and other data are to be applied to best advantage. It is the purpose of this discussion to cover briefly the basic principles which govern the flow behavior of oil reservoirs. Such reservoirs may be classified on the basis of structure, shape or on the basis of the characteristics of the producing formation, or on the method by which the fluid is produced from the reservoir. Structurally, reservoirs may be classified under any one or combination of domal, faulted, lenticular, or stratigraphic traps.

As far as type of formation is concerned, they will generally be either sand or limestone. In the case of limestone, the formation may be fractured, cavernous or dolomitic type of porosity. The fluid may be produced from the reservoir by gas drive or water drive or combination of gas and water drive. The type of drive encountered will to some extent affect the proper production rate or method of production.

As has been shown in a previous article on application of bottom hole pressure data (THE OIL WEEKLY, Aug. 31, 1942) the rate of production from a given well can be expressed analytically as

$$Q = C(P_m - P) \qquad (1)$$

where Q = production rate in barrels per day

C = well characteristic or productivity index factor

P_m = reservoir or closed in bottom hole pressure

P = pressure at sand face when well is producing at rate Q.

This productivity index factor or well characteristic is dependent on the dimensions of the well bore, on the properties of the fluid produced, and on the size and permeability of the reservoir. This factor can be expressed analytically as follows:

$$C^1 = \frac{2\pi kb\,g}{\mu \log_e \frac{r_e}{r_w}} \qquad (2)$$

C^1 = productivity index factor in $ft^3/sec/\#/ft^2$

where k = sand permeability in ft^2

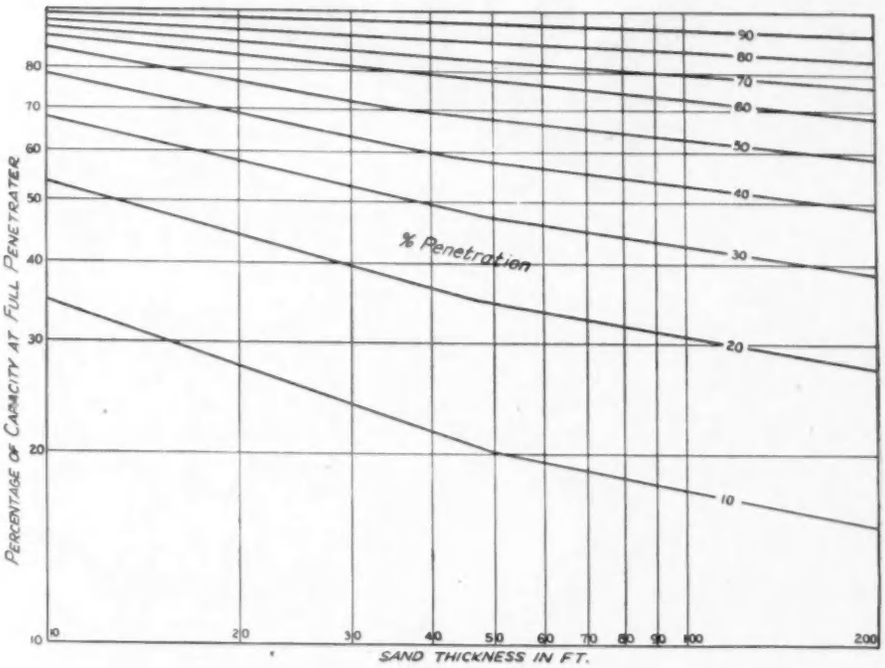


FIGURE 1
Effect of partial penetration on well capacity

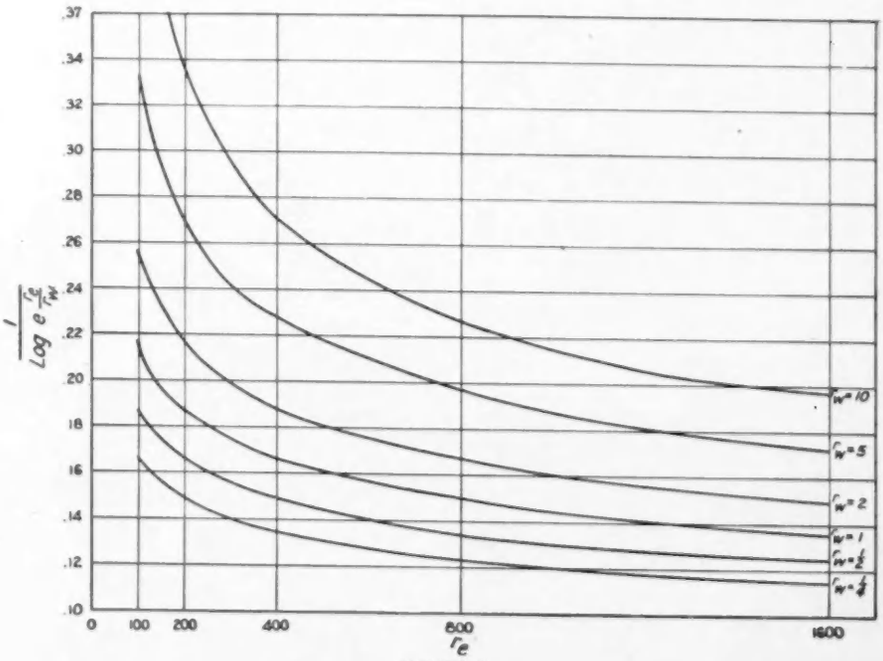
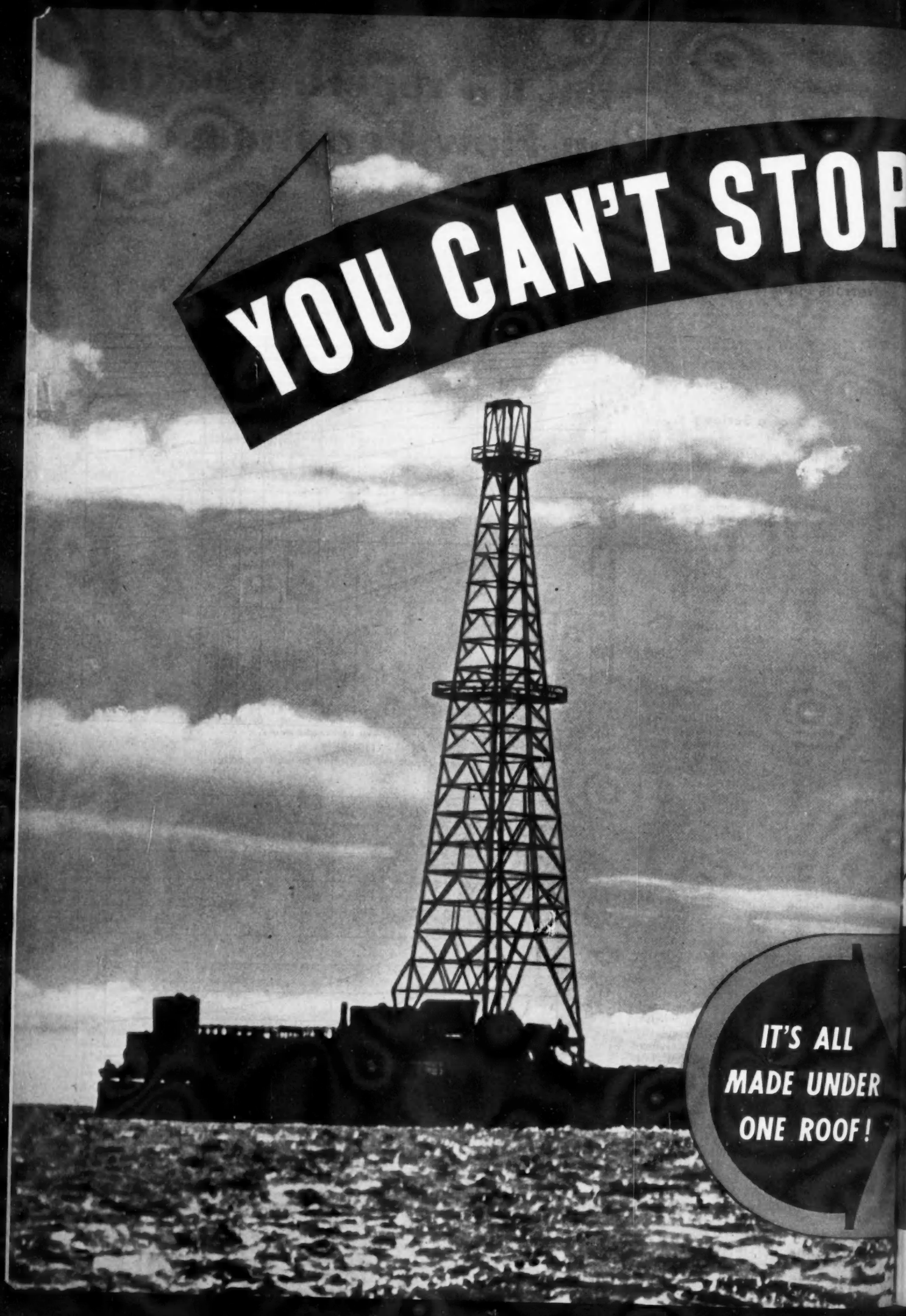


FIGURE 2
Relative effect of well bore size on well capacity for various drainage radius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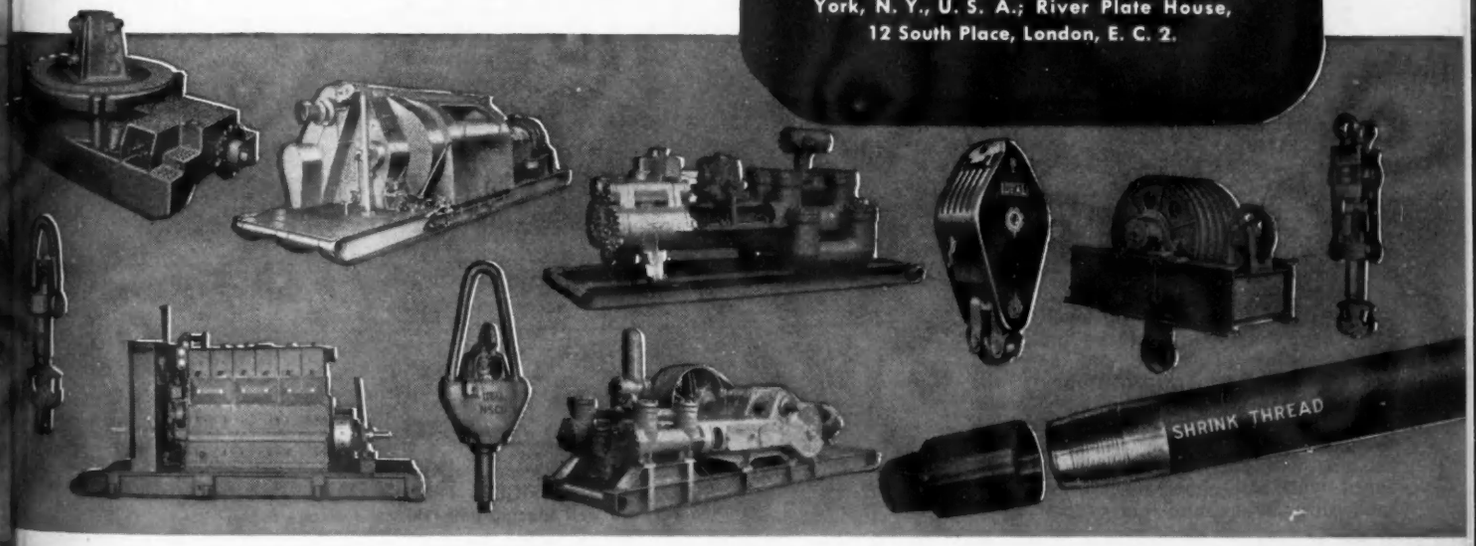


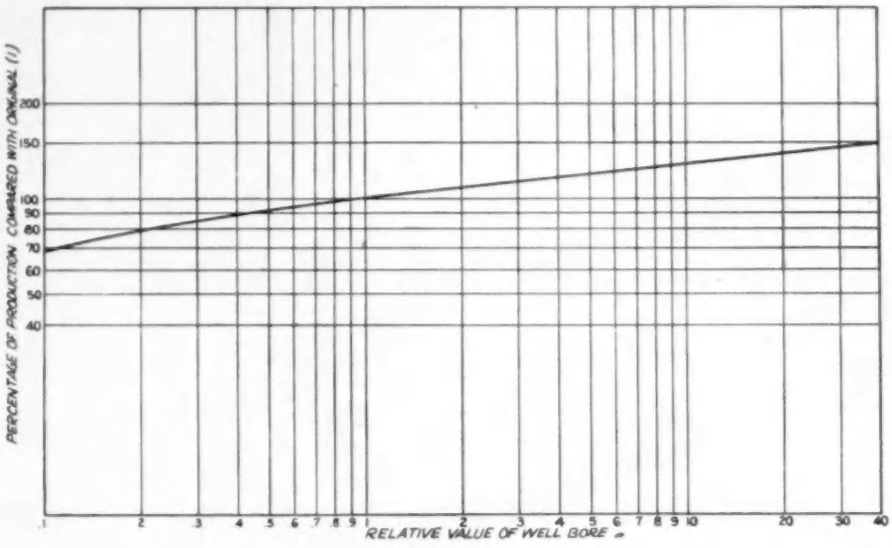


FIGURE 3

Effect of change in well bore on well capacity expressed in percentage of production with standard bore (1)

b = sand or formation thickness, ft
μ = absolute viscosity in lb/ft-sec
r_w = well bore radius, ft
r_e = well drainage radius, ft
g = 32.2 ft/sec^2

From this equation it can be seen that the ability of a well to produce will increase directly in proportion to the permeability k. Permeability is a measure of the resistance of the formation to the flow of fluid through it. The permeability will depend on the type of formation and on the size and method by which the pore spaces in the formation are connected. In the case of a sand reservoir it depends on the amount and location of cementing material as well as on sand grain size and packing. The higher the permeability the greater will be the capacity of any given well to produce. Permeability as considered from a production standpoint can be reduced by forcing material back into the formation which will either fill up the pore space or seal off pores immediately around the well. Such procedures are used in squeeze cementing and water shut-off work. Likewise, anything which will increase the size of the connection between pores will increase the permeability and the capacity to produce. Such practices as acidizing are to increase the size of the pore spaces immediately in the vicinity of the well bore and therefore, to increase the effective permeability of the well. The effect of shooting, insofar as permeability is concerned, is to produce fractures of sufficient size to effectively increase the average permeability in the vicinity of the well bore.

Equation 2 shows that the productivity index factor will vary directly as the formation thickness. If the thickness is doubled the well's capacity will be doubled. Doubling the production with a well having twice the sand thickness, however, assumes that the well penetrates completely through the formation. For the case where the well does not penetrate the formation completely, the capacity will not be as great because of the change in flow paths. Figure 1 shows a plot of the percentage of capacity with partial penetration as compared with full penetration for various sand thicknesses and percent penetrations. For example, a well in a 30 foot sand with 10 percent or 3 foot penetration would produce at a rate only 24 percent of that for a well having full penetration into the formation. From Figure 1 it can be seen that for thin formations the production rate will be much higher at any given percentage than for thick formations.

Inasmuch as the sand or pay thickness and the well drainage radius are constant for any particular well it is of interest to know how the production rate can be increased for a particular formation. The capacity can be increased if the diameter of the well bore is increased. However, as can be seen from equation 2, the increase in producing capacity with an increased well bore will be rather slight inasmuch as the well bore will vary only as the log of the ratio of drainage radius to well bore, and unless quite large increases in well bore can be obtained, it is unlikely that satisfactory increases can be obtained from this source alone.

Figure 2 shows a plot of $\frac{1}{\log_e \frac{r_e}{r_w}}$ against drainage radius, r_e, for various values of r_w. For example an increase of well bore from ½ ft. diameter (¼ ft. radius) to 1 ft. diameter (½ ft. radius) would increase the production rate in the ratio of .15/.135 = 1.09 for a drainage radius of 400 feet. For this case doubling the well bore only increases the capacity 9 percent. Figure 3 gives a curve which shows the effect of relative changes in the well bore or drainage radius. For example, increasing the well bore 40 times gives an increase of less than 50 percent in production capacity.

Figure 4 shows the radius in feet to give the equivalent area expressed in acres. This radius will be equivalent to the approximate drainage radius for various well spacings. For example, one well to 40 acres would give an average drainage radius of 750 ft. Figure 5 gives a curve which shows the effect of well spacing on the capacity of a well to produce. As in the case of well bore the effect of drainage radius is not particularly important. For example, doubling the drainage radius corresponds to a 0.5 factor multiplied into r_w/r_e and would indicate that the production rate would be reduced to 0.9 its value with ½ the drainage radius (See Figure 3). Wider well spacing, therefore, will have the effect of reducing the maximum production rate. This results because of the longer flow path. Because of variations in permeability and sand thickness it is obviously impossible to collect any physical data which would substantiate this fact. Because of the general agreement of the theory with practice agreement in this case should be expected. If it is assumed that the entire field has the same reservoir pressure, then some larger radius than that corresponding to the well spacing should be used.

The effect of well bore and drainage radius can perhaps be shown by a plot

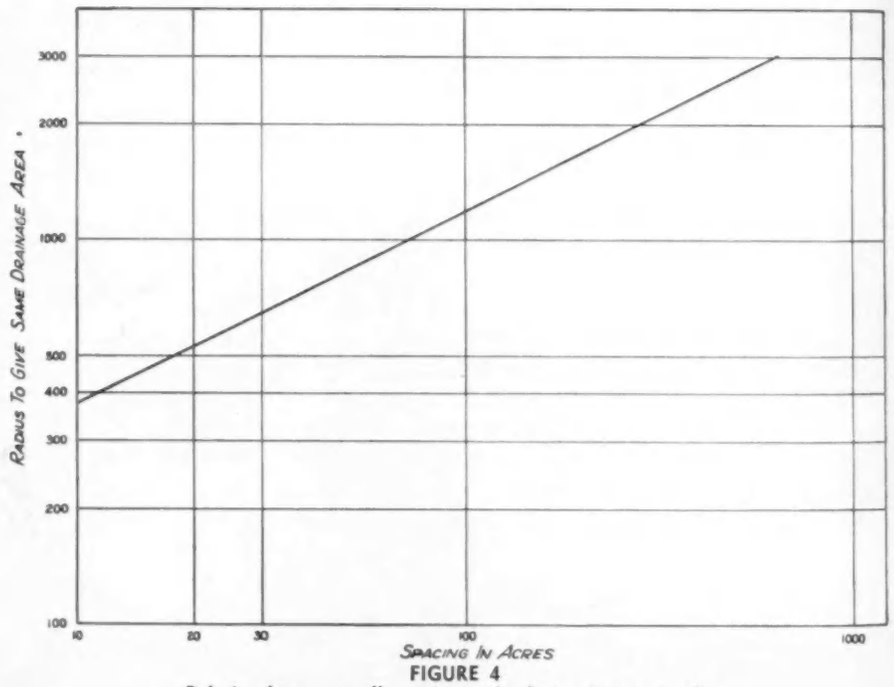
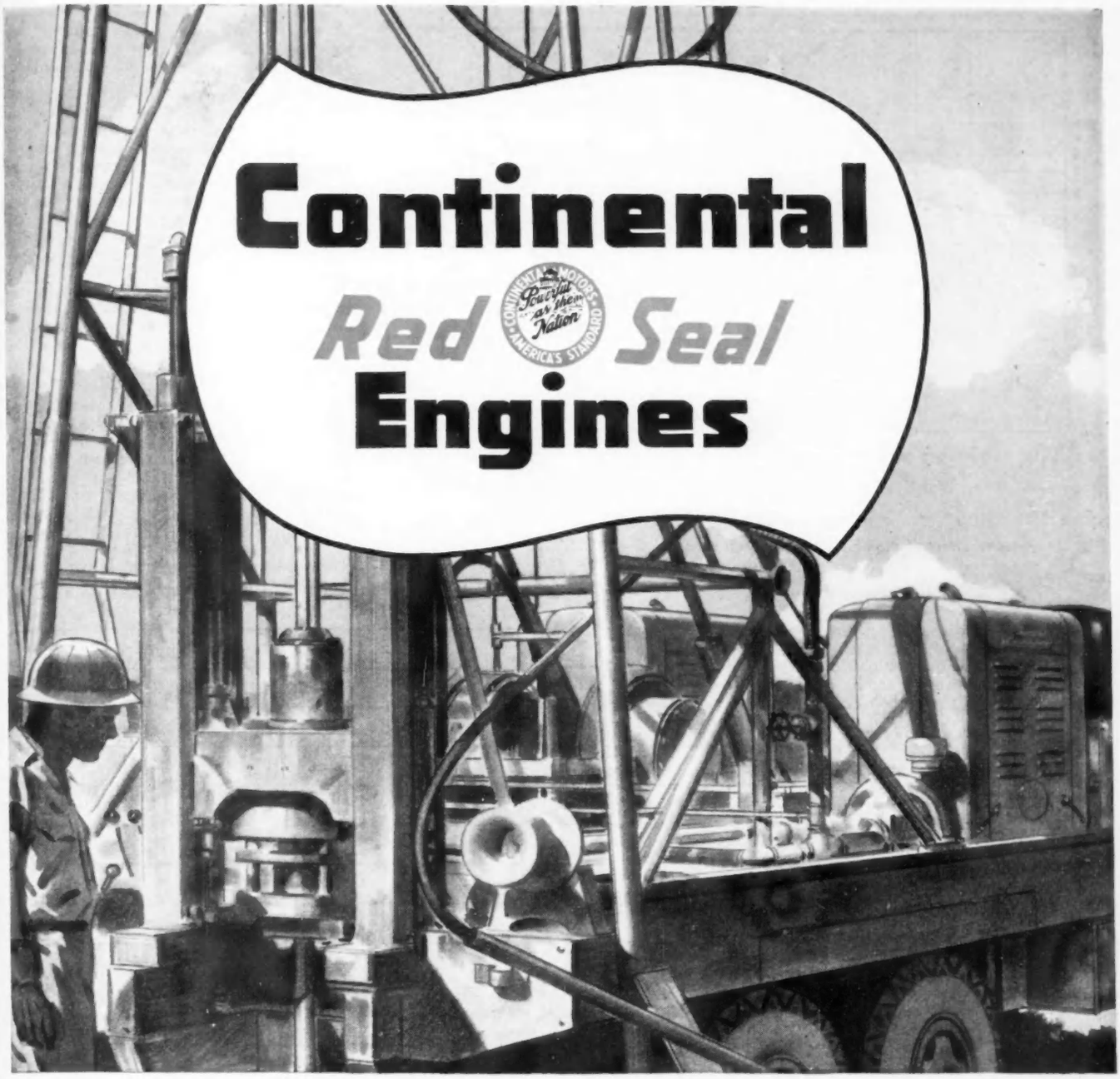


FIGURE 4

Relation between well spacing and relative drainage radius



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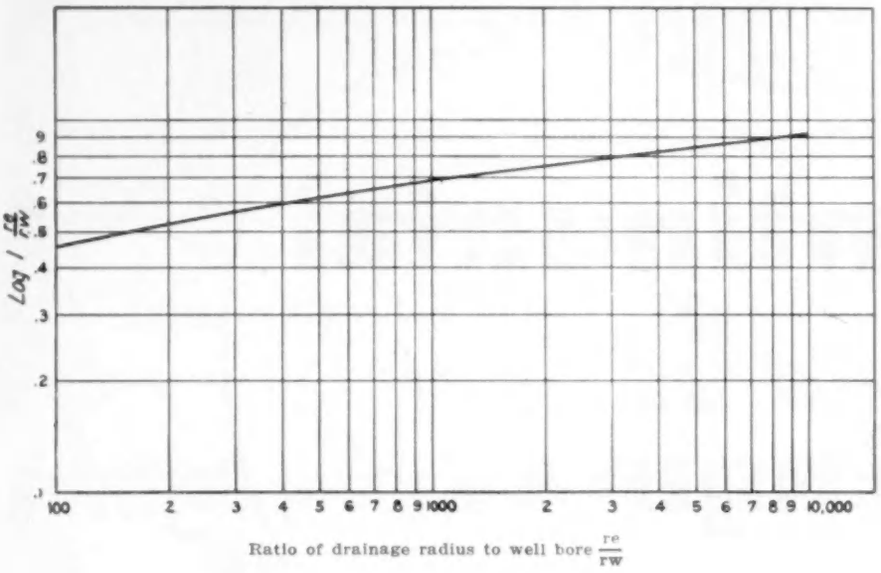

FIGURE 5

Relative effect of drainage radius on well capacity. $Q = \frac{\text{Constant}}{\log_e \frac{re}{rw}}$

of velocity and pressure in the reservoir as a function of distance from the reservoir. The relations which determine the pressure and velocity at any distance r for the center of the well bore are

$$p = \left[\frac{p_e - p_w}{\log_e \frac{r_e}{r_w}}\right] \log_e \frac{r}{r_w} + P_w \quad (3)$$

$$v = -\frac{k}{\mu r} \frac{(P_e - P_w)}{\log_e \frac{r_e}{r_w}} \quad (4)$$

Equation 4 for velocity in the reservoir shows that it is inversely proportioned to the distance from the center of the well bore. Since the area through which the fluid can flow is inversely proportioned to the circumference at any distance r, it can be seen that the velocity should likewise be inversely proportioned to the distance from the well center.

The effect of well spacing on pressure drop and velocity can best be illustrated by considering numerical cases. In order not to become involved with units, it will be assumed that $\frac{k}{\mu} = .1$ for this case. The relative values of velocity will be the same regardless of the $\frac{k}{\mu}$ value and the pressure curve is not dependent on the $\frac{k}{\mu}$. The $\frac{k}{\mu}$ value will, however, influence the size of the well. Using values of 400 ft. and 750 foot for drainage radius which corresponds approximately to 10 and 40 acre spacing respectively and a well bore of ½ ft. or a well bore radius of ¼ foot, the curves shown in Figure 6 and 7 are obtained. These curves are drawn for the case where $P_w = 0$ and $P_e = 1000$ lb/in².

Figure 6 shows a slightly higher velocity at the well bore for the case of 10 acre spacing than in the case of 40 acre spacing. This difference is due to the higher production rate obtained with 10 acre spacing as was pointed out previously. The velocity is seen to be very small near the drainage boundary.

Figure 7 shows how the pressure varies with drainage radius. It will be noted that very close to the well bore the pressure decreases rapidly and is nearly the same for 10 and 40 acre spacing. At the same distance away from the well bore the pressure for the 40 acre spacing is lower than for the 10 acre spacing. This lower pressure is the cause for the lower production. Another way of looking at the problem is that fluid produced on 40 acre spacing has to travel a long distance to get to the well bore. The longer the path, the greater pressure difference required, hence the reason for the lower production with wider well spacing.

The formulas which have been given above can be found in many articles in the literature. They can be derived on the basis of fundamental principles of viscous flow. API code 27 on Standard Procedure for Determining Permeability of Porous Media gives some of these formulas. The most complete reference is Dr. Muskat's book on "Flow of Homogeneous Fluids," by McGraw-Hill Book Company.

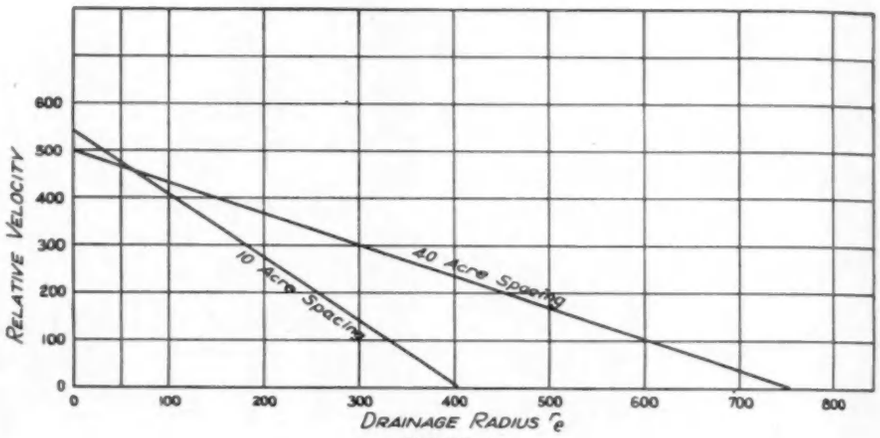

FIGURE 6

Effect of well spacing on relative fluid velocity through sand

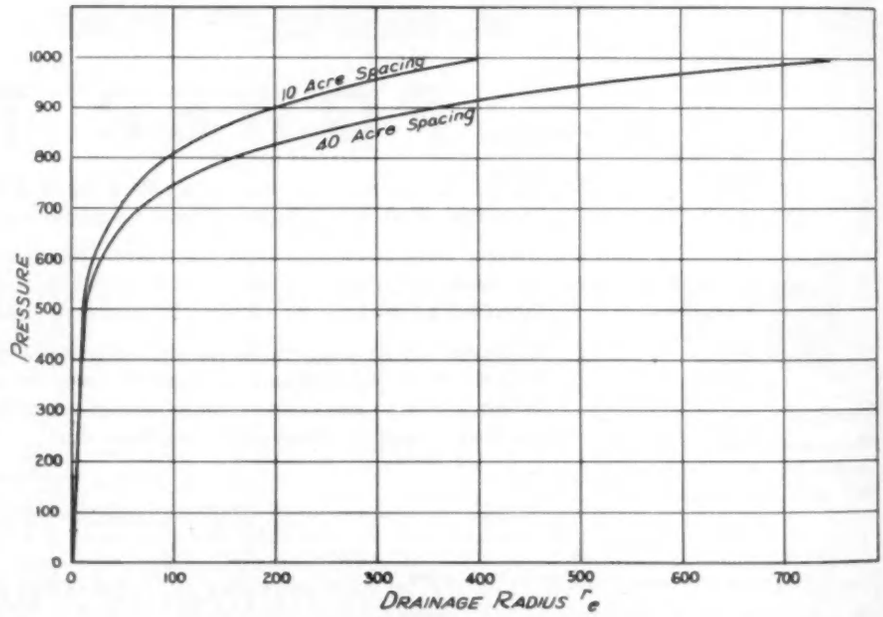

FIGURE 7

Variation in reservoir pressure with distance from well and with drainage radius

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Hydrocarbon Utilization With Gas As Chemical Raw Material

By JAMES E. PEW and FRANK H. DOTTERWEICH

Natural gas industry has unlimited possibilities in postwar period, reserves guaranteeing many years of successful operations; heavier derivatives of gas becoming important in expanding petro-chem work

THE growth of the gas industry during peacetime was accompanied by developments and operating problems primarily related to the use of natural and manufactured gas as a source of fuel and energy. While these activities were being given major attention, a new technology was being evolved—that of petro-chem development, in which gaseous hydrocarbons were being distorted, rearranged, and recombined to yield chemical raw materials from which useful products could be manufactured. Today the swift tempo of war activities places increased emphasis upon these petro-chem operations, capable of supplying our tremendous war machine with vital war products, many of which find natural gas as the basic raw material.

The wartime developments are not of a static nature but will progress steadily until the not-too-distant day when a substantial portion of our hydrocarbon derivative chemical products will have their origin in natural gas. This paper will endeavor to note processes presently available, together with those which will become generally available in the postwar period by means of which we may hope to utilize more efficiently the full range of our hydrocarbon raw material and, in addition, to analyze the effect of these petro-chem operations upon present and postwar activities of the gas industry. The future of natural gas in its capacity as a chemical raw material has occupied much space in technical publications and general discussions, and this subject continues to grow. This is true, at least in part, because of the rapidly advancing technologies, which appear destined to have profound effect upon the future of the industries involved. Natural gas is known as the ideal fuel with its superb performance bringing about the development of special heating and cooling equipment and thus furthering the earlier standardized applications, such as cooking and heating.

The stability of the gas industry and, more particularly, the natural gas section, has been built around a numerically substantial domestic load, which condition has permitted it to weather the storms of depression. In looking into the future the question arises as to what effect petro-chem developments are to have upon this industry. Naturally this problem resolves itself into, first, an analysis of available natural-gas reserves; second, a consideration of the success of new commercial processes proposed with natural gas as their chemical raw material; and, third, a quantitative study of the extent to which the use of natural gas therein will deplete those reserves.

Natural Gas Reserves

Natural gas reserves are today estimated at 110 trillion cubic feet. With marketed natural gas production approximately 3¼ trillion cubic feet in 1943, a supply sufficient for the next 30 or more years appears to be definitely assured. This compares favorably with an estimated oil production known reserve ratio of 14 years.

A further evaluation of relative importance of natural gas in the natural resources picture is provided by a comparison of natural gas and oil reserves, on a thermal or weight basis, either of which reveals their near equivalence. Probing more deeply behind these reserves figures, it may be determined that estimates of natural-gas reserves have risen phenomenally in less than 10 years. A 1935 estimate of 62 trillion cubic feet of gas reserves appeared optimistic beside others at that time; yet, in the ensuing 9 years, during which more than 25 trillion cubic feet of gas have been withdrawn from the nation's underground reservoirs, reserves estimates have risen to the present 110 trillion cubic feet for the nation.

Meanwhile, an analysis of discoveries in the highly active area embracing South Arkansas, Louisiana and the Coastal Plain of Texas reveals further that, in the years between 1934 and 1943, the proportion of gas and gas-condensate to total discoveries rose from 24 to 52 percent, with gas-condensate discoveries largely uncovered in deeper drilling increasing from 11 to 36 percent of the total during this period. The continuance and expansion of this deeper drilling program, undertaken as improvements in technique permits, may be expected to uncover an increasing proportion of fields of the gas-condensate type, existing under extremes of pressure and temperature, and these fields, productive of the lighter hydrocarbon fractions, which are proving so valuable in wartime production programs, through the installation of cycling equipment may constitute the nucleus in the postwar period of the new petro-chem technology. So much is already evident: the period and magnitude of gas-condensate discoveries is adequate to justify appreciable capital outlay, as increasing amounts of the lighter hydrocarbon materials will be made available for chemical processing and, potentially, manufactured-gas enrichment. The latter, gas enrichment with ethane-propane mixtures, should be given immediate attention by manufactured gas companies, if the advantages of a higher Btu gas of non-gumming and non-corrosive properties are to be attained.

But the gas industry has still greater possibilities ahead. The uses of natural gas to be hereinafter described are new uses, providing new markets. Gas companies possessed of a high degree of engineering skill and knowledge, with a fundamental awareness of the capabilities of their stock-in-trade, could look upon the new technology as an added source of revenue.

It is necessary to emphasize that a new market has been created for, as shall be seen, the needs of the United States for certain products in 1943 could have been met through conservation of natural gas reported lost and wasted by the United States Bureau of Mines in the 1942 Minerals Yearbook, carrying most recently published analysis of gas disposition (1941). Actual production exceeded 4 trillion cubic feet, with almost one third of this being divided between repressured and stored gas (660 billion cubic feet) and gas known lost or wasted (630 billion cubic feet). The latter figure will be used in the calculation to follow as being both qualitatively and quantitatively indicative of the magnitude of this waste. Gas loss and waste in proportion to production is decreasing as indicated in Chart 1, but the figure is still far too great, despite the intensified efforts of the governing legislative bodies to reduce it to the absolute minimum.

New and Proposed Commercial Processes

The importance and value of natural gas at present and, in the postwar period, to an ever greater extent, is a measure of the volume available and low critical material requirement for processing and production. By modern methods of extraction and fractional distillation, natural gas may be separated into relatively pure saturated hydrocarbons. Valuable in their pure state as blending agents or, when specially processed, still more valuable as a chemical raw material, giving remarkably high yields of war products. Among these are high-

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- 6 x 37 wire rope
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- 8 x 19 elevator rope
- 5 x 19 marline clad rope
- 18 x 7 non-rotating rope
- 6 x 12 galvanized running rope and hawsers
- 6 x 24 galvanized steel mooring lines and hawsers
- 6 x 37 galvanized steel hawsers
- 6 x 25 type "B" flattened strand wire rope
- 6 x 30 type "G" flattened strand wire rope
- 6 x 8 type "D" flattened strand wire rope
- 6 x 6 x 7 tiller rope
- 6 x 7 iron, bright, and galvanized sash cords
- 9 x 4 galvanized mast arm rope
- 6 x 19 marline clad grain-shovel rope flat rope
- 6 x 7 galvanized iron rigging and guy rope

octane aviation gasoline, synthetic rubber, explosives and plastics, all being made in great quantities with petroleum and natural gas as key components. Too, new processes and products are constantly undergoing development, and natural gas will continue to grow in importance as a chemical raw material.

In discussing the newer methods of conversion, not only into the essential raw materials, but also into the final products, it appears desirable to divide these into (1) processes directly concerned with the production of superior liquid fuels from natural gas, and (2) processes concerned with the production of other chemical raw materials.

Liquid Hydrocarbon Fractions from Natural Gas

Such hydrocarbons as propane and butanes occur in appreciable quantities in wet or casinghead gas, and are largely removed before the gas is marketed. At the present time propane-butane fractions serve as liquefied petroleum gases and also as feed materials from which certain aviation-fuel components are derived. Production of super aviation fuels, composed of select hydrocarbon fractions in definite proportions, requires large quantities of iso-octane alkylates, cumene, tetraethyl lead, and other essentials. An appreciable amount of these ingredients has its origin in natural gas—in fact, a finished aviation fuel may be produced altogether from fractions obtainable in exploitation of the nation's gas-condensate fields.

Production of liquid hydrocarbon fractions from dry natural gas is presently receiving attention. Processes involved have been developed commercially by European powers and are related to those through which Axis nations are now synthesizing gasoline from coal. The increasing reserves of natural gas in this country, viewed in conjunction with heightened consumption and decreased finding power of crude oil, are presently accelerating interest on this subject.

In the past, liquid hydrocarbon fractions have been prepared by a process commonly referred to as the Fischer-Tropsch process. In this process, water gas (carbon monoxide plus hydrogen) is the raw material. In Europe water gas has been prepared with coal or coke as the starting raw material. However with the modern steam conversion process, in which natural gas and steam are made to react to form water gas or hydrogen as an end product, a more reasonably synthesized liquid fraction is available. The importance of the process in relation to America's 110 trillion cubic feet of gas reserves cannot be overemphasized for it makes natural gas well-nigh competitive with crude oil. Natural gas could possibly be one of the starting raw materials if the crude oil supply is to be supplemented or supplanted in the synthetic hydrocarbon fractions.

With natural gas as the starting raw material, three steps are involved: reforming to water gas, synthesis into liquid hydrocarbon fractions, and recovery and separation. The three are already being practiced separately on a commercial scale, and the problem resolves itself into "flanging up" these operations and perfecting operating conditions so that this synthetic liquid may be produced on a favorable economic basis. Investigation of the combined processes is now being undertaken in pilot-plant operations, with estimates as high as 4.2 gallons of liquid products recoverable per thousand cubic feet of dry natural gas, including fuel gas. This

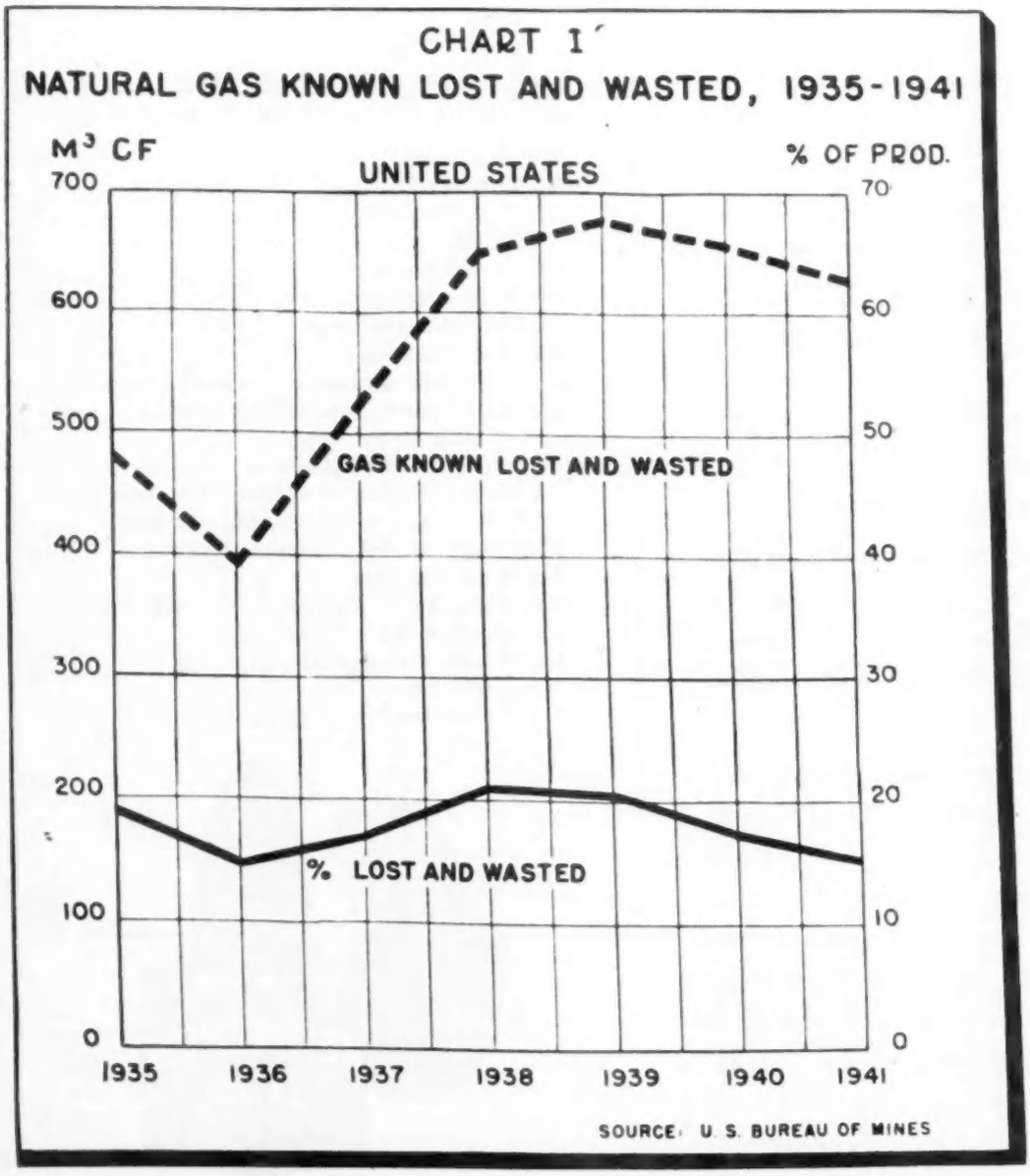

CHART 1
Showing by United States Bureau of Mines figures the gas loss and waste in proportion to production and how the trend has been decreasing.

FACTS about your Climax engine

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GAS BUTANE GASOLINE

THROUGH GREATER FUEL BURNING FLEXIBILITY

The Climax combination gas, butane and gasoline fuel system is a 3-time-protection against lost time due to lack of **One** or **Two** fuels. This triple burning equipment is particularly valuable in remote wildcat areas, where fuel is scarce or costly, and in locations where economies can be made by burning the lowest cost fuel.

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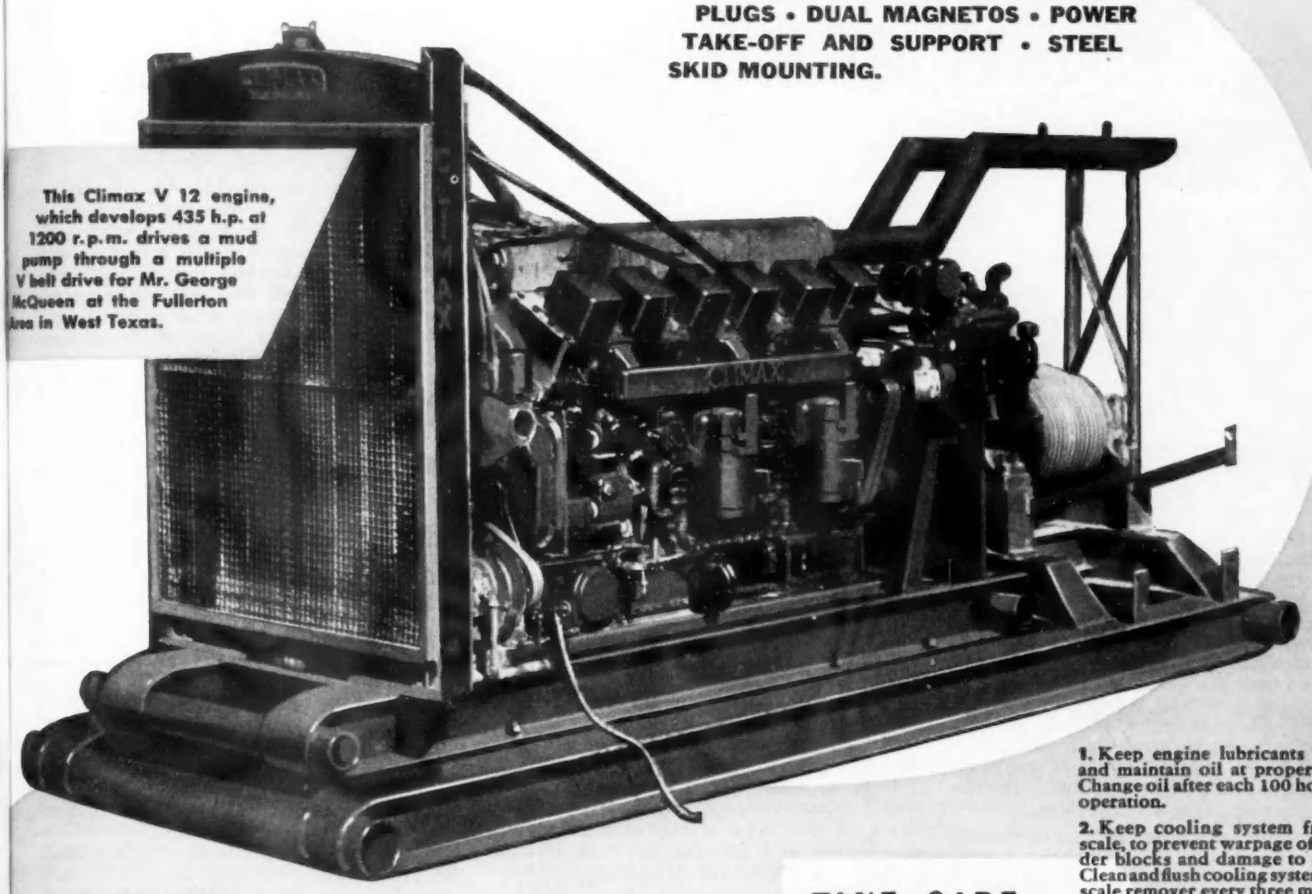
Other standard equipment on Climax drilling engines includes: QUICK GAS ENGINE STARTING • DUAL SPARK PLUGS • DUAL MAGNETOS • POWER TAKE-OFF AND SUPPORT • STEEL SKID MOUNTING.



This Climax V 12 engine, which develops 435 h.p. at 1200 r.p.m. drives a mud pump through a multiple V belt drive for Mr. George McQueen at the Fullerton Area in West Texas.

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1. Keep engine lubricants clean, and maintain oil at proper level. Change oil after each 100 hours of operation.
2. Keep cooling system free of scale, to prevent warpage of cylinder blocks and damage to heads. Clean and flush cooling system with scale remover every three months.
3. Maintain tappet clearances at those shown on engine nameplate. Check every two weeks with thickness gauge.
4. Keep fuel clean.
5. Keep outside surface of engine clean and dry to prevent ignition harness failures.

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TABLE 1

Synthetic Organic Chemical	United States 1943 Production (Pounds)[1]	POSSIBLE PROCESSES AND RAW MATERIALS		
		Basic Hydrocarbon Raw Material	Intermediate Hydrocarbon Raw Material	Processes
Acetaldehyde	224,445,142[2]	Ethane Propane	Acetylene	Regenerative Cracking
Acetic Acid (100 percent)	264,898,632[2]	Ethane Propane	Acetaldehyde	Regenerative Cracking
Acetone[3]	336,000,000	Butane	Isopropyl Alcohol	Tubular or Regenerative Cracking
Acrylic Resins	25,000,000[4]	Butane	Ethylene Propylene	Tubular or Regenerative Cracking
Ethyl Alcohol	344,000,000[4]	Ethane Propane	Ethylene	Tubular or Regenerative Cracking
Formaldehyde (40 percent)	485,000,000	Methane	.....	Steam Conversion or Catalytic Oxidation
Methyl Alcohol	430,000,000[4]	Methane	Water Gas	Steam Conversion
Isopropyl Alcohol	380,000,000	Butane	Propylene	Tubular or Regenerative Cracking
Vinyl Resins[5]	100,000,000	Ethane Propane	Acetylene Ethylene	Regenerative Cracking

[1] Approximated by Chemical and Metallurgical Engineering (February, 1943). [2] From U. S. Tariff Commission (1942 Production).
[3] It is assumed that the greater portion of acetone is derived from isopropyl alcohol as shown. [4] Estimated from basic data in Chemical and Metallurgical Engineering (February, 1943). [5] Including Vinyldiene Chloride.

Material requirement: The total production of synthetic organic chemicals, by processes as shown, could be produced from the recoverable ethane propane, butane fractions of 480 billion cubic feet of natural gas (about 75 percent of the 1941 gas lost or wasted) with the accompanying methane and heavier residue converted into approximately 44.4 million barrels of gasoline, diesel, heavy oil mixture via the Steam Conversion and Fischer Tropsch Processes.

yield if proven practical is approximately equivalent to one barrel of a mixture (chiefly gasoline, diesel oil, and heavy oil), per 10,000 cubic feet of dry natural gas.

Chemical Processes—New and Proposed

Chemical developments related to natural gas are numerous, and progress is being made constantly. In this paper major attention is to be directed to the preparation of products derived from natural gas which serve as chemical materials from which many useful products may be derived.

The steam conversion process, to some extent developed in this country, is outstanding because it reforms dry natural gas to water gas or hydrogen. Water gas, in addition to being the base product in manufacture of liquid fuels may be the starting point in production of synthetic alcohol and formaldehyde. War and peacetime uses of hydrogen are many, but chief among them is the production of synthetic ammonia for use in explosives, fertilizers and hydrogenation processes (principally in the production of super fuels).

The regenerative furnace process makes available still another method of cracking natural gas. This furnace, now ready for commercial operations, produces important starting chemical materials, such as acetylene, ethylene and propylene from natural gas constituents, not excluding methane, but with ethane and heavier fractions more desirable. Still another method is provided in the electrical production of acetylene. This method is being thoroughly investigated in pilot-plant operations, and may be expected to be of importance in the postwar production of acetylene.

Production of carbon black, of fundamental importance to the rubber, printing and paint industries, has long utilized about one tenth of this country's annual production of natural gas through the simplest of chemical reactions into which methane, the principal component of natural gas, enters—combustion and thermal decomposition. Carbon black is today being prepared from natral gas alone in channel and roller plants (typical of contact methods of manufacture), and thermal and furnace plants. A product similar to the furnace type is also being prepared from degraded oil and natural gas in combination. It is interesting to note that the thermal production of carbon black had its origin in the derivation of hydrogen, from natural gas, with the thermal black representing merely a by-product. It is, then, possible to obtain two products through one process. Production of hydrogen is alone economically feasible, even in areas of high gas cost; the relatively cheap, coarse grade of carbon black obtained, capable of being used in extremely high loadings, represents additional revenue.

Oxidation process is now in commercial operation, with natural gas serving as a raw material in the production of formaldehyde, methyl alcohol, acetone and acetaldehyde, among others. Present processes yield a mixture of these oxidation products, and economics require that the market absorb all of these derivatives if the high cost of production is not to be imposed upon any one end product. It is possible that more recently developed processes now undergoing examination will permit conversion of natural gas exclusively into one product, thus eliminating economic uncertainty. (The subject of producing oxyhydrocarbon derivatives by alternative method is considered elsewhere herein.)

Chlorination of natural gas and its derivatives to form chlo-hydrocarbon solvents is of proven commercial importance, while their use has been greatly increased in wartime. The peacetime uses of these compounds have been greatly curtailed or eliminated in order that they may be made available for war uses. These compounds are of great importance, both in chemical warfare and in the synthetic rubber industry, as well as in many other uses demanding near or absolute non-flammability plus excellent solvent power for oils, fats and other organic materials. Improved processes of this type are continually being developed, and natural gas will remain one of the important raw materials.

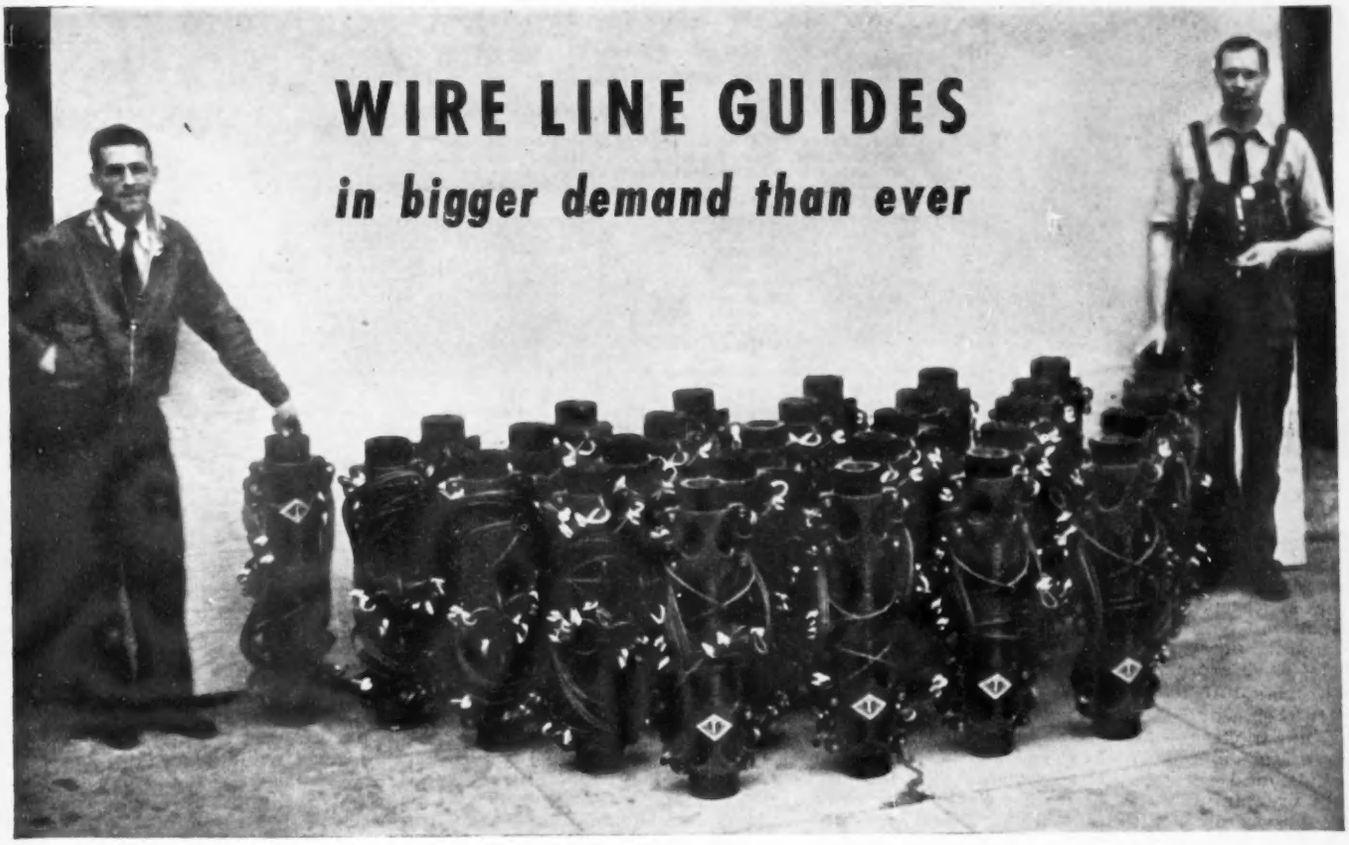
Vapor-phase nitration of natural-gas hydrocarbons on a commercial-plant basis has produced the four nitroparaffins; nitro-methane, ethane, propane and butane, thus making available for chemical synthesis a group of compounds with a potential range of usefulness unequaled by any other new group of organic chemicals. These compounds are more than just another group of new compounds because they open an entirely new field of organic chemistry, a field which some day may rival development of the coal-tar derivatives in magnitude and scope. At the present their entire production is going into essential war uses for the synthesis of pharmaceuticals, dyestuffs, insecticides, rubber chemicals, photographic developers, textile chemicals and resins, together with their use in solvent applications. The entire postwar industry, particularly the highly specialized industries, should find these nitroparaffins a fertile source of improved and new chemicals for new and better products.

In addition to being of great importance as a raw material in the processes previously cited, natural gas is forging ahead along other lines. An example is the production of carbon disulfide, presently derived by heating sulphur and charcoal. Recently published laboratory research indicates that high yields of carbon disulfide may be obtained through the high temperature reaction of methane and sulphur, and that methane and other hydrocarbons offer possibilities as cheap raw materials in this production, such new processes making use of natural gas as a chemical raw material, are introduced daily.

Quantitative Requirements of Natural Gas in Its Capacity as a Chemical Raw Material

Diversified opinions have been voiced regarding the magnitude of demands which may be made of natural gas in its capacity as a raw material for the rapidly developing petro-chem industry. The view most generally held, and one in which the authors have concurred, is that demands will be slight by comparison with the enormous volumes annually used for fuel. An attempt has accordingly been made in the following paragraphs to evaluate these demands quantitatively, based upon production figures for various organic chemicals which were synthesized during 1943. As will be shown, all of these could have been produced with a fraction of the natural gas loss and wastage to which reference was earlier made.

Methane is suitable for the production of acetylene, particularly by electrical methods, and may also be used in the steam conversion process whereby formaldehyde or methanol may be obtained. With these possible exceptions, ethane, propane, and butane provide more desirable raw materials. Accordingly, use has been made of these fractions in the following study, with the lean gas then being converted into me-



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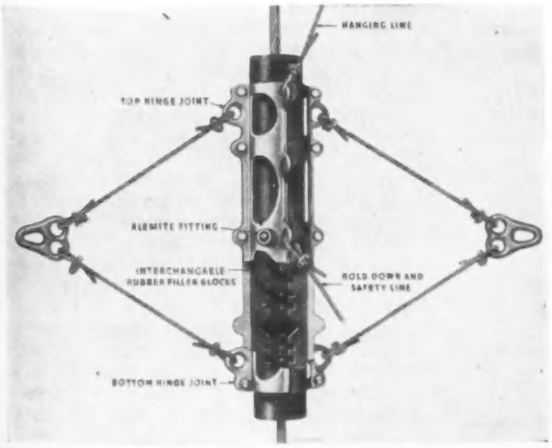
Prevent Rapid Line Wear

Permit faster reeling



TO GET the fullest life from wire lines, Drillers are demanding Patterson-Ballagh Wire Line Guides. The demand is growing daily. These Guides perform two vital functions. They increase the life of the line anywhere from 10% to 50%, and they help speed up drilling. Lines can be run faster. The wobble is dampered. Lashing of the line from crown to drum is eliminated. These guides keep the line running true and maintain perfect spooling. Don't deny your crew this vital aid.

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TABLE 2
(Alternate Method)

Synthetic Organic Chemical	United States 1943 Production (Pounds)[1]	POSSIBLE PROCESSES AND RAW MATERIALS		
		Basic Hydrocarbon Raw Material	Intermediate Hydrocarbon Raw Material	Processes
Acetaldehyde	224,445,142	Ethane Propane	.....	Oxidation
Acetic Acid (100 percent)	264,898,632	Ethane Propane	Acetaldehyde	Oxidation
Acetone	168,000,000	Ethane Propane	.....	Oxidation
Acetone	168,000,000	Butane	Propylene	Tubular or Regenerative Cracking
Acrylic Resins	25,000,000	Butane	Ethylene Propylene	Tubular or Regenerative Cracking
Ethyl Alcohol	344,000,000	Butane	Ethylene	Tubular or Regenerative Cracking
Formaldehyde (40 percent)	485,000,000	Ethane Propane	.....	Oxidation
Methyl Alcohol	268,500,000	Ethane Propane	.....	Oxidation
Methyl Alcohol	161,500,000	Methane	Water Gas	Steam Conversion
Vinyl Resins	100,000,000	Butane	Acetylene Ethylene	Tubular or Regenerative Cracking

[1] Refer to Table 1 for source of data.

Material Requirement: The total production of synthetic organic chemicals, by processes as shown, could be produced from the recoverable ethane, propane, Butane fractions of 630 billion cubic feet of natural gas (total gas lost or wasted, 1941) with the accompanying semi-dry gas converted into approximately 55.5 million barrels of gasoline, diesel, heavy oil mixture via the steam conversion and Fischer Tropsch processes.

thanol and formaldehyde sufficient to fulfill the requirements of these products, and the remainder entering into the synthesis of liquid hydrocarbon fractions by means of the Fischer-Tropsch process. The conversion factors used are not improbable for the early postwar period.

In the recovery of the heavier hydrocarbon fractions from natural gas, their conversion into basic chemical raw materials, and their subsequent synthesis into organic liquids, the latest available recovery and yields were used. Inasmuch as part of the data is restricted, total requirements are given rather than any detail.

Source of Synthetic Chemicals

Reference to Table 1 divulges that the estimated production of these synthetic organic chemicals, as listed, could be derived largely through regenerative cracking from the recoverable ethane, propane and butane content of 480 billion cubic feet of gas (about 75 percent of the gas reported lost and wasted in 1941). The residue dry gas could then be synthesized into 44.4 million barrels of a gasoline, diesel oil, and heavy oil mixture. An alternate method, illustrative of the diversity and flexibility of available processes, is considered in Table 2. This method is constructed chiefly around oxidation processes presently being employed in the conversion of natural-gas derivatives to certain basic chemical raw materials of use in the war effort. The synthetic organic chemicals indicated could be produced, again, from the reported 630 billion cubic feet of gas loss and wastage in 1941, with the remaining semi-dry gas available for synthesis into approximately 55.5 million barrels of a gasoline, diesel oil and heavy oil mixture.

Notably, also, production of the majority of synthetic chemicals itemized in Tables 1 and 2 was achieved principally through use of ethane, propane and butane, or less than 20 percent by weight of the natural gas. Further, in view of the fact that ethane, propane and butane fractions are presently extracted from natural gas and are readily transportable by modern methods, this study loses its hypothetical character and assumes practical economic stature. It is, then, interesting to note that although dry natural gas (principally methane) is of importance as a chemical raw material, analysis of the extent situation suggests that the heavier available fractions be utilized. Such use will preserve for the natural-gas industry its source material—dry natural gas.

Additional dry natural gas will also be made available for conversion into liquid hydrocarbon fractions, chiefly the aforementioned mixture of gasoline, diesel oil and heavy oil. Pilot-plant operations are now getting under way, and it is altogether likely that in the near future natural gas will be a raw material in commercial-scale operations. A potentially enormous volume of natural gas could thereby be utilized in supplanting the anticipated early decline in productivity of crude oil. However, it is the authors' opinion that, although natural gas may be used in this capacity, its conversion to liquid hydrocarbons will take place in locations readily accessible to one or more fields but inaccessible to pipe-line outlets, and where gas was perhaps even being wasted. Petroleum reserves should continue to bear by far the greater part of the load through imports and new discoveries in the United States. When large-scale conversion is necessary, oil shale and coal may be expected to provide the principal raw material sources. Natural gas may play a part therein, but only on a secondary scale, since the huge quantities required for Fischer-Tropsch conversion may be prohibitive. Moreover, potentially greater yet less exhaustive needs exist for natural gas in its capacity as a chemical raw material.

Future of Natural Gas as a Chemical Raw Material

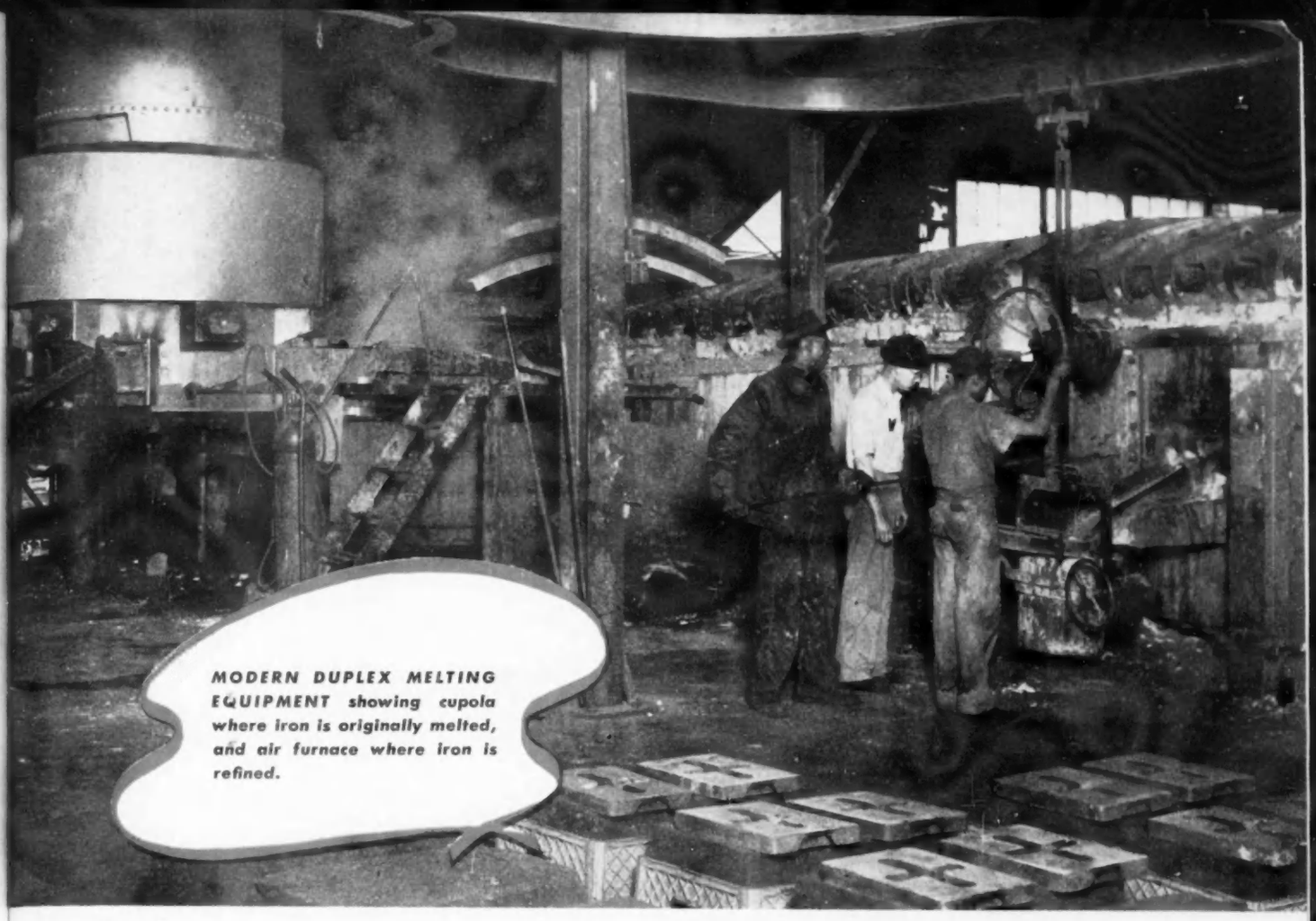
An analysis of the future of natural gas in this capacity as a chemical raw material has its background in the role asumed in World War II. Today large quantities enter into the production of carbon black, absolutely essential in the successful use of synthetic rubber, not only for tire-compounding, as was the case with natural rubber, but for all other uses. Appreciable quantities of natural gas derivatives are also used in the production of synthetic rubber. Still other quantities enter into the production of modern aviation fuel. Some 50 percent of the emergency synthetic ammonia is produced from hydrogen derived through the decomposition of natural gas by the steam conversion process. Further, and as yet small portion of the synthetic organic chemicals listed in Table 1 and 2 finds natural gas as the starting raw material. The present use of natural gas as a chemical raw material is in itself an amazing accomplishment, strongly indicative of postwar use.

It is evident from the foregoing that the chemical product derivatives of natural gas provide the public with a potential source of new and improved materials — materials with amazing industrial applications, developed through the gas chemist's molecular magic. What may be less obvious is that they also present the gas industry—particularly, but not necessarily exclusively, with a potential source of new revenue.

Gas Institute Important

By and large, the gas industry has played a passive role in the attainment of experience relating to the new petro-chem developments, as well as in the technical research which that experience precludes. It is to be hoped that the establishment of the Institute of Gas Technology at Chicago typifies a dress rehearsal for a more active role—one in which Frank C. Smith, president of the Southern Gas Association, has been most aggressive in demanding. The important work of the Gas Institute must be continued, even expanded, under the gas industry's sponsorship. But this is only a start. Outposts should be established in colleges and universities throughout the country through grants set up by the gas industry.

From the foregoing it is evident that the natural-gas industry has unlimited possibilities in the postwar period and many years thereafter. Reserves guarantee many years of successful operations with heavier derivatives of natural gas becoming of increasing importance as chemical raw material in the ever-expanding petro-chem operations. Although dry natural gas is of importance as a chemical raw material, less exhaustive needs exist for it, with present trends suggesting that heavier fractions are more desirable for chemical processing. These conditions should preserve for the natural gas industry its source material — dry natural gas. Thus, a balanced market is being created to use the complete range of our gaseous hydrocarbons, assuring maximum hydrocarbon utilization with natural gas as a raw material.



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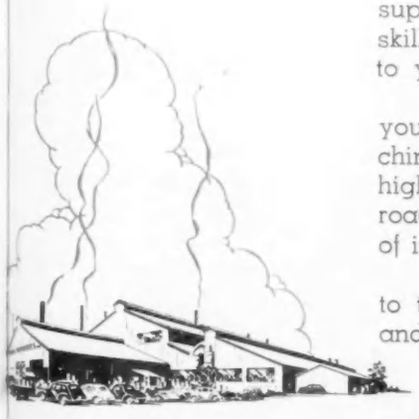
When your postwar products are in the drawing board stage, advice as to the use of malleable iron may save you money for years to come . . . and help you win and hold customers by giving them superior products.



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PRACTICAL OPERATING *Hints* FOR THE PRODUCTION MAN

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1. SERVICING

Wire Line Holdback Clears Work Space

Loop of light line, formed to rig dimensions, ties pitman and beam during service job.

ANY small time-saving idea, when used on several hundred pulling jobs, can easily amount to a substantial saving in a year's operations. One large company, operating a number of standard-end pumping unit wells, uses a simple system of holding the pitman and walking beam out of the way when the well is being pulled. Involving no special equipment, the idea consists of using a light ¼-inch steel cable, looped on each end and just long enough to reach from the crank end of the pitman, when the latter is off the crank and pulled forward to the base of the Samson post, to the well end of the walking beam.

On wells that are pulled frequently, the wire is permanently affixed to the walking beam and the loose end tied back to the Samson or headache post, so that as soon as the reins are disconnected from the rods, and the pitman is taken off the crank pin, it is only a minute's work to have the well ready to pull.

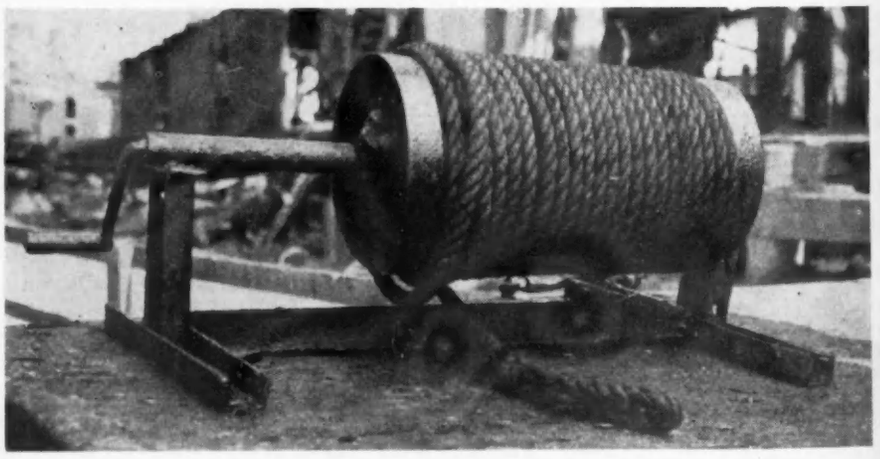
Not only does this system save time in the rigging-up operations, but it also makes the pulling work safer for the men, since there is no chance of the walking beam breaking loose and fouling the pulling line or traveling block.

2. ROPE CARE

Special Reel Forms High-Line Storage

TIME spent in stringing up derrick lines preparatory to pulling a well is being cut and the work made easier for the production crew of one company by carrying the soft-rope high-line on a small reel mounted on the side of the lease truck. Built of scrap materials, the reel consists of two automobile brake drums secured to the end of a length of small casing, the whole mounted on a light channel-iron framework, and secured to the truck bed by light bolts which are easily removed if the truck is needed for other work.

As the line is carried up the derrick, the reel unwinds unattended, but on recovering the line, the operation is speeded by using an automobile crank assembled on one end of the reel axle. The line, long enough to reach to the crown sheave and back to the ground again, is kept spooled in this reel permanently and is used only for a high-line. Loops fashioned in the ends are always available without having to stop and make them each time the line is needed.



Formed from scrap pipe, a pair of automobile brake drums and some salvaged channel iron, this unit insures prompt reeling of the line when not in use and protects it during job change.

3. LUBRICATION

Reservoir Protects Beam Rocker Unit

Mounted atop beam, with flexible leads to box, this container reduces lubricating rounds.

A SMALL reservoir, mounted atop the walking beam, and connected by copper tubing to the upper halves of the bearing housing, provides a flow of oil to the bearing and eliminates the need for frequent lubrication of the unit. By inserting needle valves or even the usual quarter-turn stopcocks in the copper feed lines, the amount of oil flowing to the bearing may be regulated

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BACKING TO CARRY THROUGH

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PAGES 3079 THRU 3098
IN THE 1943-44
COMPOSITE CATALOG

so as to require any desired time for emptying the supply from the reservoir, and the amount of lubricant below the pin thus kept at desired level despite losses which may occur.

4. HAND TOOL CARE

Solvent Well Aids Wrench Cleaning

Light table, with rectangular well at end, provides support and cleaning bath for hand tools.

CONTRIBUTING to the loss of numerous man-hours in the field is lost motion when handling oily and fouled pipe wrenches while on a repair or well-pulling job. Threads and thumb nuts becoming jammed with an oil and sand mixture shortly are all but impossible to manipulate. In addition, since it is difficult to obtain a good grip on the pipe or fitting because of the clogged jaw teeth, it often results in injury to the man by the tool slipping its grip from the pipe fitting. A practical means of avoiding this sort of trouble is contained in the small tool rest table.

Constructed of used pipe and sheet iron, the table has at one end a rectangular well 6 or 8 inches deep which is kept partially filled with solvent. Each time a dirty tool is laid down on the bench it is placed in the solvent and by the time it is to be used again it will have been sufficiently cleaned or the dirt will have at least softened up to permit quick cleaning with a wire brush. Built on the order of a drain board, the upper end of the table drains into the solvent well, and to prevent tools sliding off the table pan, the latter was welded to the bottom side of the rectangular framework, protecting the enclosure.

5. FLOW CONTROL

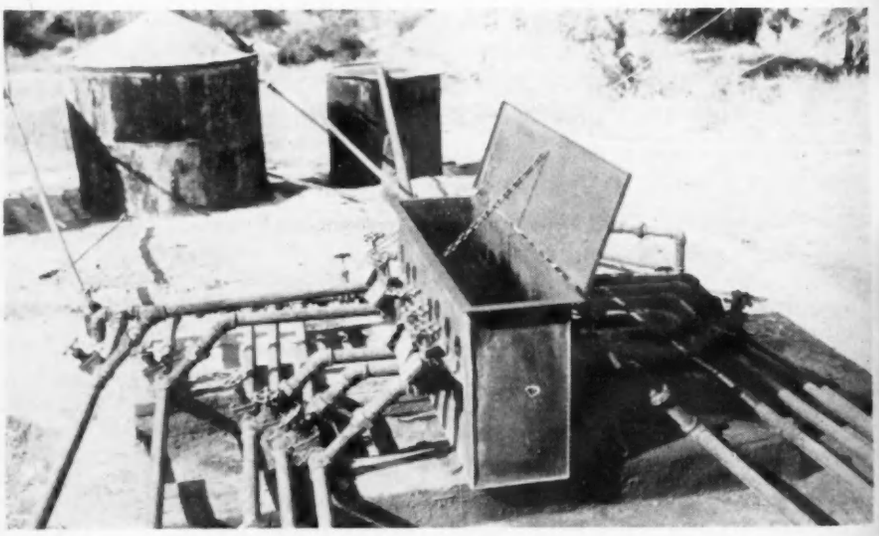
Look Box on Lines Affords Well Check

VISUAL check of the production from stripper wells frequently brings to light flow characteristics which are not evident when production is carried directly to settling tanks, and recognition of the difficulty often permits change which can make the difference between profit and operating at a loss.

One company brings all flow lines from its stripper lease to a central point, equipping each line with branch and regulating valve so the flow may be diverted at will through a long narrow steel "look box" in which the production may be watched for abnormalities.

The box cover is a tight fit, and may be padlocked in the closed position to eliminate fire hazard. Drainage from the box is toward the settling tank, with the incoming fluid under observation from the time it flows from the entry nipple until it drains through the outlet.

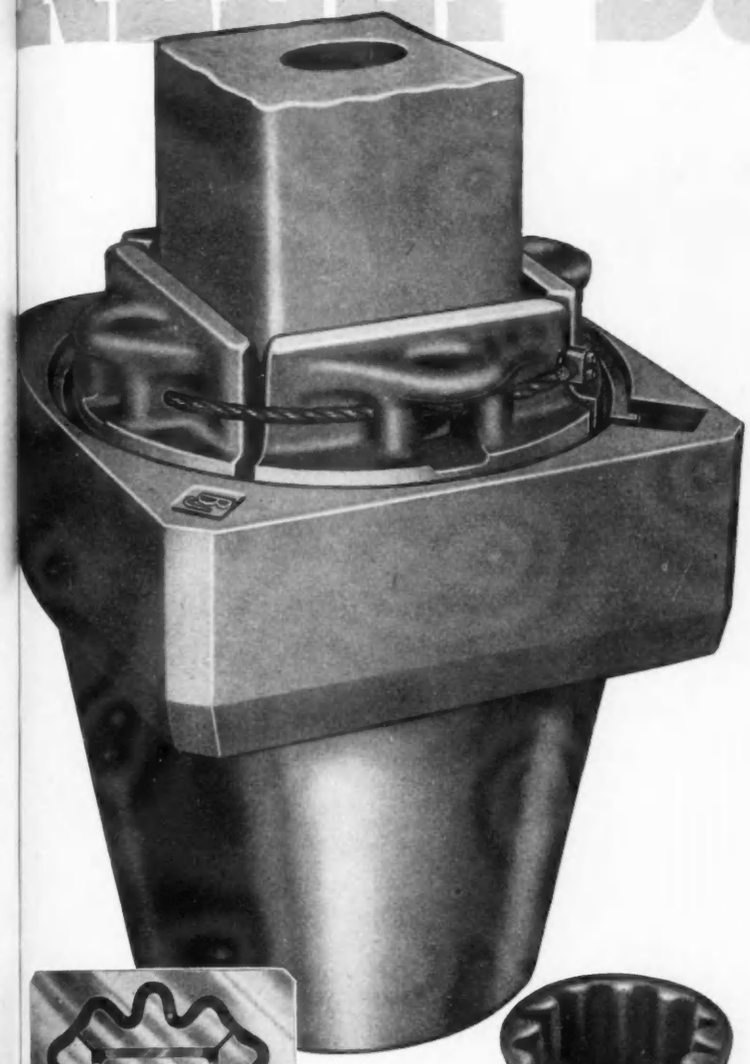
Use of the "look box" provides quick spotting of wells slugging water or otherwise varying from the average output as determined from testing the contents of the settling tank.



Bypasses from stripper flow lines enter this box and, through valve control, permit fluid from selected well to be observed as it is produced, enabling quick adjustment if needed.

KELLY BUSHING

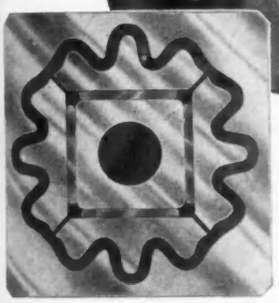
Here is that "Shock-absorbing"



Crews like it because it eliminates jarring, and insures a smoother feed of the Kelly—no hanging up and then dropping the bit with danger of a twist-off. Owners like it because of its economical performance—long life—and because it smooths up and polishes the Kelly, providing an even feed to take better, full-length unbroken cores.

A heavy, corrugated rubber cushion fits between the slips and the body, and absorbs the impact that otherwise is thrown against the master bushing. Liners are made of long-wearing, manganese-bronze, and this anti-friction bearing material polishes and smooths up the Kelly. Liners are readily switched end-for-end to provide a new surface on the driving side; and are inexpensively replaced, when required, on the rig and without the need for shop fitting or special tools.

Described on Page 589 of 1944 Composite Catalog; available through your supply store.



Sectional view showing how "shock-absorbing" rubber cushion fits between the liners and the body.

This heavy-duty, long-wearing corrugated rubber cushion absorbs the impact previously thrown against the master bushing.

Slips with liners attached are easily installed or removed; note above how snap ring holds liners in place.

Inexpensive, readily replaced, manganese-bronze liners are switched end-for-end to provide new surface on driving side.

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Safe for casing strings of any length—fast and easy to operate—and now available with Hydraulic Slip Setting Mechanism for added convenience. See Page 580 of the 1944 BJ, or Composite Catalog.

This new elevator with modern safety latch has increased capacity over former Type A Elevator. API sizes from 2⅛" to 7"; rated capacities from 175 to 225 tons. See Page 597, 1944 BJ, or Composite Catalog.

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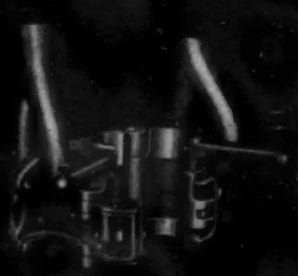


PRACTICAL OPERATING *Hints* FOR THE PIPELINER

$5.00 will be paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, *Houston*

1. SHOP REPAIRS

Welding Jobs Speeded With Movable Seat

MUCH of the repair work done by the welder in the shop may be classified as bench work, where the parts being repaired are supported on some sturdy base, and where the job is brought to the welding equipment, instead of the unit being taken to the job.

On such work, speedier and more uniform beads can be turned out if the welder can be seated, and thus able to concentrate more closely upon the application of metal. To eliminate the delay met in searching out the bench or stool —all too frequently in use elsewhere when needed by the welder—one shop equips the benches with revolvable seats, mounted on the pipe legs of the support. The seat is a section cut from light tank plate, reinforced with a rib on the under side, and welded to a pipe collar of the proper size to slide freely on the pipe leg of the bench.

A second collar, fitted with set screw and extension handle to eliminate wrench need, is slipped onto the table leg below the seat, the supporting unit then being clamped at any desired height by turning up the set screw.

Set on sleeves with adjustable supports on bench legs, these seats prevent welder's fatigue.

To prevent swinging and possible deformation of the seat when the bench is to be trucked to another job, a second set screw—this one without wing or extension—is threaded into the lower half of the guiding collar so the seat may be locked in position when swung under the table top for protection.

2. BUILDING CARE

Scraper and Pit Reduce Floor Work

THE usual type of scraper or hoe blade mounted beside the lower step to field or pump-station office is effective only if the visitor notes—and uses—the device. To prevent tracking of debris into one office in terrain where sand and mud combined to promote excessive wear of the floor paint, a grille-type scraper, welded up from scrap material at the site, was let into a bricked-in entryway in such a manner that scraping off the accumulations on the shoe soles was almost automatic as the visitor came to the steps.

By setting the grille over a shallow hole, with sufficient space to permit the accumulation of some little mud and sand, it was possible to dispose of the scrapings when they reached sufficient proportions, simply by lifting the grille and shovelling aside the waste material.

Such a pit, when terrain permits, may be made with a drain into nearby lower ground, and then a hose with sufficient water pressure may be used to flush out the accumulation, and the grille then anchored firmly in place instead of being left removable.

3. LINE MAINTENANCE

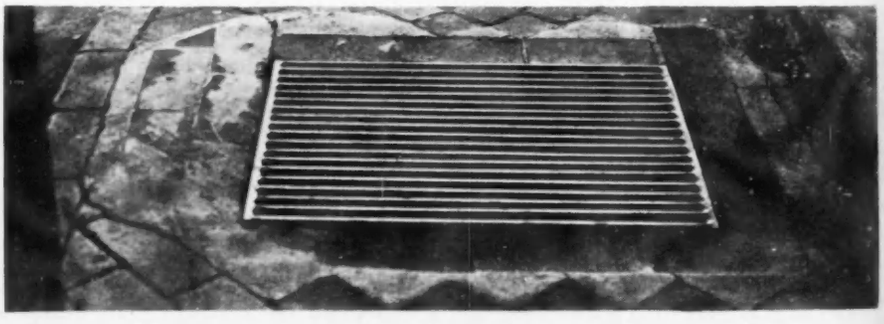
Portable Bell Hole Speeds Swamp Jobs

PIPELINE repair in a swamp interposes many handicaps not met in normal maintenance, and the building of cofferdams and attempting to pump out the enclosed space not only asks that the crew work in mud, but frequently in water which impedes the repair and may even introduce serious accident hazard.

One gas company, having hundreds of miles of line in swamps and low-lying country, has developed a portable "seagoing" bell hole which may be quickly placed, and then pumped dry to afford ample space for a welder to make any type of weldment, even along the bottom line of the pipe, where corrosion pitholes most frequently occur.

The bell hole consists of a wooden box, made of tongue-and-groove stock and caulked, the box being split along a line through the center of the holes cut to enable the unit to be clamped around the pipe. Bolts through ears or brackets along this line of cleavage permit the unit to be pulled together tightly around the pipe, and in so doing to compress the hemp packing between box and pipe to form a watertight joint.

The box is usually made to enclose but one size of line—that of the main trunk system—but may be made to fit



Grille of rods or strip metal, set to provide multiple scraping edges, and supported over collection pit, provide ready means for cleaning muddy footwear before entering the office.

Trenching it's BUCKEYES

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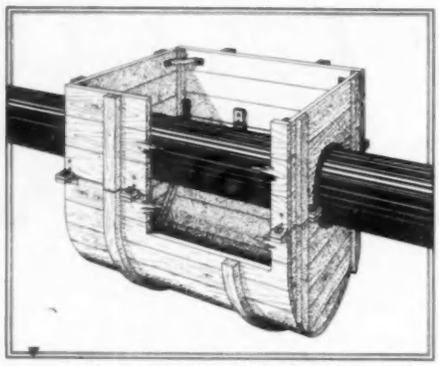


Illustration Courtesy United Gas Log

Watertight box provides dry bell hole for repair of line in swamp country without raising pipe.

the largest diameter used, with split flanges applied on smaller sizes to bring the diameter at the box edge to the desired size.

The bell hole is rolled or rotated into a hole scooped or shovelled out below the pipe, and without regard to the amount of water which may be standing therein, the water included within the box being pumped out and the working space made as dry as required by the amount and type of work to be done on the section of pipe isolated between the packing glands.

4. SALVAGE

Yard Vise Mount Speeds Disassembly

PROPER anchoring of the heavy vise greatly simplifies the breaking up of discarded pipe assemblies, valves and other units requiring large wrenches and extended leverages. The danger of slipping is eliminated, and the accident rate cut by providing rigid mounting for the unit, and adequate support for long joints and assemblies.

One company set a piece of 8-inch casing in a heavy concrete base, extending the footing laterally to provide insurance against shifting during wet weather. A steel plate large enough to take the vise bolt circle was welded firmly atop the pipe, the vise being mounted thereon at the height most desirable for breakdown jobs.

To afford support to extended assemblies, and thus to relieve the vise jaws of all save gripping load, a light frame of ⅝-inch sucker rod was welded together to form a stand of height equal to the vise jaw level. The top member of the stand consisted of a short pipe nipple or roller slipped over the top transverse member, to afford ease of adjustment of the long work pieces, and with short spuds or spikes extending upward to retain the work on the support. Flared and braced legs provide against possible overturning when the work is shifted.

Heavy pipe, set into concrete footing, carries steel plate for standard bench vise base.

5. EXHAUST LINES

Bellows-Type Joint Absorbs Expansion

Dished disks, welded to exhaust line and joined along edges, provide flexibility at close turn.

INSTALLATION of an expansion joint in an already-existing exhaust line usually means considerable excavation work, a number of extra fittings, and possible rearrangement of the line itself. Simplifying this problem is the expansion device built by a company welder to be installed in the exhaust line of a large single cylinder pumping engine. Because of proximity of the engine house to a roadway, it was necessary to turn the line through 90 degrees only a few feet from the manifold. To absorb all expansion stresses the joint had to have ample capacity, yet be small enough to fit in the short space between the engine and the right-angled turn in the line.

Two light sheet steel discs, each 18 inches in diameter and with their centers cut out to fit over the ends of the exhaust line, were dished slightly by cutting a small wedge-shaped section out of their periphery and rewelding. Placed with the concave sides together, the outer edges were then welded. A short section of the exhaust line was torch-cut out and the expansion device inserted between the two ends and welded into the line.

☆ ☆ ☆ ☆ WASHINGTON ROUNDUP ☆ ☆ ☆ ☆

THE IMPENDING British-American conference on world oil problems was the major subject of discussion in Washington last week, with speculation directed toward the effect of the conservations on the nation's war-born synthetic-rubber industry and Petroleum Reserves Corporation's Saudi Arabian pipe-line project.

These two subjects were conceded to be the major matters to come before the conference, influencing all decisions made on the questions of efficient development of world resources, conservation and free access to supplies for all nations.

The discussions, expected to extend over a period of several weeks, are to be followed by similar meetings between United States officails and representatives of the Dutch government-in-exile, the oil-producing Latin American countries and, eventually, Russia.

While there was much speculation over the international oil situation, there were concrete developments during the week of considerable significance to the oil industry.

Moving to straighten out the muddled situation with respect to registrants under 26 years of age, the selective service set up a dozen categories of industrial activity under as many war agencies in which the deferment of key men would be authorized in plants specified by the appropriate agency. Both PAW and the Office of Rubber Director were in the group, the former reportedly with 2100 and the latter with 1800 men for whom deferments would be sought.

At the capitol, a House appropriations subcommittee released testimony of Secretary of the Navy Frank Knox regarding the Elk Hills situation, proposed exploration in Alaska and the Saudi Arabian pipe line, in which it was told that the idea for government assistance in the Middle East field was initiated by the companies themselves, who were "concerned" over their position.

Definite Congressional Policy on Elk Hills Shaping

Oil Men Selected Advisors for British-American Meeting

Part of Fund for Exploration Work in Alaska Approved

By B. F. LINZ,
Washington Correspondent

☆ ☆ ☆ ☆

The appropriations committee gave the Navy the million dollars it sought for wildcatting in Naval Reserve No. 4, but turned down all requests for money to be spent on Elk Hills, pending a determination by Congress of the policy to be followed with respect to Naval Reserve No. 1.

Another House committee was warned during the week that before it concluded hearings on continuation of the emergency price control act, now due to expire June 30, it would receive pleas for the breaking down of price regulation, among them a suggestion that control of oil prices be turned over to PAW. Appearing before the house banking and currency committee, Price Administrator Chester Bowles characterized such proposals as indefensible and contended that price regulation as now practiced has halted the upward trend of living costs without serious impairment of the economic pattern.

Richard Joyce Smith, New York lawyer, has been named counsel for the special Senate committee investigating petroleum resources.

The committee, which already has held executive sessions in which it interrogated State Department officials and Secretary Ickes, is expected to open public hearings early in May.

British-American Oil Discussions Scheduled to Start Within Few Days

Oil discussions between the United States and British governments, to begin within the next few days in Washington, will be followed by similar conversations with the Netherlands government-in-exile, Russia and the oil-producing Latin American countries.

Purpose of the conferences is to develop a platform of postwar exploitation of world oil reserves in such a way as to prevent international friction and give all nations free access to supplies.

The State Department made known that the initial Anglo-American conversations would deal with efficient and systematic development of world oil resources; prudent conservation measures; fair distribution of oil to all countries; avoidance of national restrictions imposed as arbitrary aids to the production of synthetic or substitute rubbers, and similar problems.

Several members of the British delegation in Washington since last month are laying groundwork for the discussions. The group comprises Sir William Brown, secretary of the Ministry of Home Security, chairman; Commodore A. W. Clarke, Royal Navy; Sir William Fraser, chairman of Anglo-Iranian Oil Company; Sir Frederick Godber, managing director, Shell Oil Company; F. Harner, British Treasury; J. H. LeRougetel, Foreign Office; F. C. Starling, principal assistant secretary, Petroleum Division, and V. Butler, secretary, Oil Control Board.

The State Department announced on April 11 that United States representatives would be: Charles Rayner, State Department petroleum adviser, chairman; Ralph K. Davies, Deputy Petroleum Administrator, vice chairman; Paul Alling, deputy director, Office of Eastern and African Affairs, State Department; Leroy Stinebower, adviser, Office of Economic Affairs, State Department; George Walden, special assistant to the Deputy Petroleum Administrator; C. S. Snodgrass, director, Foreign Refining Division, PAW; Brigadier General Howard Peckham, War Department, and Commodore A. F. Carter, Navy Department.

Of major importance to the American oil industry will be results of conferences on development of Middle East oil resources and the future of the synthetic-rubber industry.

Commentators have gone so far as to say that the whole future of synthetic rubber may be decided in the meetings with the British and Dutch delegations.

Springboard for the discussion of rubber will be the question whether the infant industry should be encouraged by the imposition of protective tariffs in view of its use of petroleum, an irreplaceable commodity, as against the "farm crop" of natural rubber.

The British and Dutch delegations are expected to argue that the use of oil for the production of rubber is not consistent with the objective of conservation, and that the natural-rubber trade is one of their main hopes for postwar financial rehabilitation and should not be barred from any world market by unnecessarily high tariffs.

While the British and Dutch governments have direct interests in oil and rubber, the United States government has a large investment in synthetic rubber and, despite Vice President Wallace's declaration that no postwar protection is to be accorded the synthetic-rubber industry, there is definite belief in Administration circles and in Congress that the development of synthetic rubber should be encouraged.

Fate of Synthetic Rubber

It is also realized that while the government might get out of the synthetic-rubber business—and, in fact, plans to do so—it would be impossible to tell private industry that it could not embark in the business, and industry is known to be aiming at the production of synthetic at a cost where it will be able to compete with natural, tariff or no tariff.

A further possible handicap to the British and Dutch efforts to protect their natural-rubber business is seen in the rubber-from-alcohol process, which, while somewhat more costly than the petroleum process, cannot be attacked as an unnecessary consumer of oil.

While it is not expected there will be any debate on the desirability of efficient development of world oil resources, conservation and equitable distribution, it is expected that there will

be serious discussion of the exploitation of the Middle East's vast potential resources which will involve PRC's project for a Saudi Arabia pipe line. A spokesman for the British government recently intimated that there was no intention of raising any diplomatic objections to the project. In some Washington circles, however, that statement was not seen as a definite assurance that the British would not seek to impose conditions on the project.

The Senate oil committee is expected to begin its public hearings on the world situation early next month, possibly before the Anglo-American conferences end, with the pipe line likely to be among the first matters investigated, and may develop more definite information regarding the British position.

A large number of British industry representatives will accompany the official delegation but American oil men will not officially participate in the discussions, although an advisory group has been named.

Department of Justice representations that official participation of industry representatives would not be compatible with the anti-trust laws is said to have necessitated their designation as consultants. However, it was said, the views of the industry will be consulted in all matters, in conformity with Secretary Hull's assurance to the group which visited him in February (THE OIL WEEKLY, February 7).

Oil Men Advisors

The industry group will consist of Orville Hardin, Standard Oil Company of New Jersey; John A. Brown, Socony-Vacuum Oil Company; William R. Boyd, Jr., chairman of PIWC; W. Alton Jones, Cities Service Company; A. Jacobsen, Amerada Petroleum Corporation; Ralph T. Zook, president of IPAA; J. Frank Drake, Gulf Oil Corporation; W. S. S. Rodgers, The Texas Company, and George A. Hill, Jr., Houston Oil Company of Texas.

The group met with department officials April 12 and 13 except for Hill, who was unable to come to Washington.

Revocation of PAO-11 To Be Discussed Soon

PAW officials are expected to meet with industry representatives in Texas probably April 24 to thrash out the question of revocation of PAO-11.

Reportedly, the suggestion for the meeting came from the industry but PAW officials for some time have been smarting under criticism of their control of spacing and other requirements which it is contended can as well be handled by the state regulatory bodies, and there have been indications that they would welcome the opportunity to talk the matter out with oil operators.

Meanwhile, a revision of Supplementary Order 5 is expected to be issued shortly, to permit 10-acre spacing all sand pools and 20-acre spacing through the McClosky limestone in Illinois, Indiana and Western Kentucky.

Rayner explained that the impending discussions will be "informal and exploratory." Any definite determinations which come out of the meetings will be put in the form of recommendations to go to the President's committee of which Secretary Hull is chairman and to the corresponding British committee, for further discussion on the cabinet level.

It was emphasized that whatever is finally decided as the policy to be followed on the basis of the long considerations which lie ahead will be aimed at receiving the approval of the government, the oil industry and the people, without which, Raynor said, nothing can be successful. There will be no effort to side-step the authority of Congress to approve international treaties and agreements. The extent to which it is planned to consult the industry dispelled any fears that might have been entertained of secret understandings between this and any other country.

Knox Explains Naval Oil Figures To Subcommittee of the House

The House appropriations committee last week called a halt to Navy operations in the Elk Hills reserve pending clarification by Congress, and refused to approve appropriations totaling $1,050,000 asked for the shutting in of producing wells in the event of condemnation of private lands and leases, the purchase of leasehold interests and operating equipment in the recently expanded reserve and the reimbursement of Standard Oil Company of California for expenditures under the short-lived operating contract of November, 1942, which was outlawed last summer by the Department of Justice.

Instead of $2,720,000 asked by the department for the fiscal year beginning July 1, next, the committee approved only $1,000,000 for exploratory operations in Naval Reserve No. 4 in Alaska and $50,000 for the normal expenses of the director of naval petroleum reserves.

Pointing out that the course to be pursued with respect to the Elk Hills field awaits legislative action on recommendations to be made by the committee on naval affairs, the appropriations committee decided to hold in abeyance all appropriations for the reserve.

Secretary Frank Knox told a House appropriations subcommittee that the department seeks legislation dealing with the problem of drainage of Naval Reserve No. 1 by private land-owners outside the reserve and principally by operations on the privately owned Coles Levee structure to the east which may drain from the Stevens zone underlying Elk Hills, and will definitely state the use to which the Navy oil reserves are to be put to in times of emergency.

"The whole question of oil is one of vital and acute interest right now," Knox declared. "It seems there is an obligation that has been laid upon the Navy Department to learn as quickly as possible just what we have in the oil reserves already set aside, and also press for development of processes to extract oil from shale and from coal and in every other way prudently prepare for a period when our resources in oil will be less than they are; and they are certain to be less."

However, he said, no exploration of the Elk Hills Reserve can be undertaken until Congress develops a policy for handling the problem of the private holdings within the area; if such a policy permits, an appropriation then will be sought for determining the potential content of the field, probably in the neighborhood of $2,140,000.

Knox told the committee that condemnation would be the "easiest" way of consolidating the reserve but, he added, "I cannot justify in my mind an expenditure of a large sum of money to acquire title to a body of oil uncertain in amount, complete control of which is offered to us for nothing."

Members of the committee expressed doubt over the legality of the Navy's operations, in view of the outlawing of the original contract for unit development, and Knox agreed to ask the Attorney General for an opinion as to whether the reimbursement payments could be made.

Ruling of the Department of Justice that the department cannot produce oil without further legislation, Knox said, may make it necessary to shut in the 275 wells on the property at a cost of $1,000 per well. That opinion was rendered on December 8, and it was not until March 14 that the legislation was introduced.

Alaska Exploration

Exploration work in Alaska probably will be handled by Seabees, and if the party now surveying the field reports it desirable, six wells will be sunk to 7000 or 8000 feet.

"I think this is important work, and under the present set-up we are the only people who can do it," Knox said.

The reconnaissance party is due back soon, and it is hoped that a party can be sent up, with a rig capable of drilling to at least 10,000 feet, to the vicinity of Cape Simpson during the two months of the summer in which ships can get into the Point Barrow area.

Navy representatives were vague as to how the oil was to be brought out of the country if any considerable production was achieved, but suggested that a pipe line might be run to Fairbanks, 450 miles away.

As a wind-up to his testimony, the Secretary gave his full approval to the Petroleum Reserves Corporation Saudi Arabia pipe-line project.

Knox explained that the American companies became interested in the Saudi Arabian reserves after they had been offered to the British, who thought there was no oil there.

The matter of government assistance was proposed first by the companies themselves, he said, after they "became a little alarmed over the situation" where they found themselves, "with no support from their own government, in possible competition with the British government and with the British companies having all the support and prestige that the British government could bring."

Original negotiations contemplated, first, a 50-50 government-company own-

ership, and later, a third government interest, but all suggestions that the government take an interest in the companies were dropped because of fear in the oil industry that the government was going to get into the oil business, Knox explained.

"Then we started to make some plans to build some refineries in that area but not in the field," he said. "Under that condition, negotiations were reopened on the basis of building a pipe line from the Persian Gulf to the Mediterranean to make this oil available quickly and cheaply to the Mediterranean and to Europe."

The major factor, he asserted, is that it protected American ownership, "because we assumed, and I think it is a correct assumption, if the United States government was vitally interested in this field, no one is going to come in there or take the concessions away."

Bowles Opposes Move of PAW Fixing Oil Prices

Anticipating moves to weaken his control over prices, Price Administrator Chester Bowles warned the House Banking and Currency Committee April 12 that before hearings end on extension of the Emergency Price Control Act it would be asked to turn the fixing of oil prices over to PAW.

Urging continuation of the law in its present form, Bowles strongly opposed suggestions that OPA price control functions be split up among various agencies, with oil going to PAW, industrial materials to WPB, foods to WFA, etc.

Representatives of the oil industry are scheduled to appear before the committee April 21, at which Russell B. Brown, general counsel of the Independent Petroleum Association of America, will present a number of witnesses.

Deferment Classes for 18-26-Year Group Listed

Deferments for men in the 18-26-year age group in 12 groups of war activities were provided for April 11 in telegraphic instructions sent to state selective service directors by General Lewis B. Hershey, Selective Service Director.

Each group is under the jurisdiction of one of the war agencies, including PAW and the Office of Rubber Director, the activities under the former including aviation gasoline program and synthetic-rubber components, technical services vital to aviation gasoline and synthetic-rubber components and special technical services essential to the production of crude oil.

Approximately 4000 men in the oil and rubber industries will be granted deferments under the new system, estimates by the Inter-Agency Industrial Deferment Committee, April 11 indicate.

Of the 140,000 engaged there are 2600 men under 26 in the aviation and synthetic rubber branches of the industry while of the 150,000 employed in exploration and production of crude oil, 4000 are under the 26-year limit.

Members of the industry were urged by Deputy Administrator Davies April 14 to lose no time in filing all deferment requests that will be made for key men under 26 years.

Immediate Condemnation of Standard Holdings at Elk Hills Advocated

A definite hint of the position which the House Naval Affairs Committee will take with respect to Elk Hills legislation was given April 13 by Representative Carl Vinson of Georgia, chairman, who, attacking both the proposed contract between the Navy and Standard Oil Company of California and the Walsh bill to legalize the contract, told the House that the only proper course for the government to take is to condemn Standard's holdings immediately.

Vinson elevated the matter to the status of a major issue, "clearcut and vital to the interests of this country," declaring that the contract is "an attempt to use the war as a pretext for exploiting and developing oil in these reserves which the Congress has said repeatedly must only be touched to prevent drainage" and an agreement which, with the Walsh bill, 'will strip the Congress of its control of these vital resources and turn them over to the executive with full power of development'."

Although the proposed contract has been offered as a "temporary policy," terminable at any time, he said it would be economically impracticable for the government to terminate it, and while it contemplates that Standard may withdraw up to 25,000,000 barrels of oil, it would be necessary for the Navy to take out 91,000,000 barrels just to get even. The contract is so hedged about with limitations on the actions of the Secretary of the Navy, he intimated, that the secretary would find it impossible to act independently.

Congress By-passed

Under the Walsh bill, Vinson said, the Navy may enter into a contract for the complete exhaustion of any or all of the naval petroleum or oil shale at any time. The authority of Congress to control operations will be by-passed by a provision that the department can pay its share of costs by taking more oil from the reserve, thus avoiding the necessity of asking for appropriations.

"It is clear that the provisions in question, allowing the sale of the oil in the reserves to raise money to pay costs of development and operations, is patently illegal under existing law, because Congress alone has the power to dispose of public property," he said. "The Secretary of the Navy could just as well be authorized to sell our battleships to raise money to erect a new building for the Navy Department. The present proposed contract does not contain such a provision, but the Secretary will have it if we pass this bill and he can amend his contract accordingly."

Vinson cautioned the House lest there be a recurrence of the Teapot Dome scandal, and pleaded against placing control of the reserve in the hands of executive officials "against whose judgment will be pitted the combined influence of the commercial people."

Referring to the contention that the contract will solve the problem of drainage, Vinson said "It omits the only real method, that of eliminating, not merely limiting, the problem of drainage; that is, there is the other alternative of acquisition by the government of Standard's lands, which, if done, will, once and for all, do away with drainage.

While he admitted that the Navy is assured under the contract of receiving an accounting for every drop of oil it owns, and so cannot lose money, Vinson asserted that while this may be sound from a financial point of view, it is not sound from the standpoint of conservation.

"Finally, in connection with S. 1773, and the question of purchase or condemnation, let me remind you that the Secretary of the Interior has proposed and possibly begun to undertake, the construction in Arabia of an oil pipe line that is estimated to cost $165,000,000, or as much or more than it will cost to acquire Standard's lands in Elk Hills. I say to you that one barrel of oil safely conserved in the ground in the United States is worth more for the ultimate defense of this nation than 1000 or 10,000 barrels in Arabia. If we let go by this opportunity to enlarge and guard our domestic reserves, because of the cost involved, a cost which is comparatively insignificant, then we have endangered the nation at what may in the future be its most vulnerable point—a supply of oil to enable our ships and planes to protect it."

House Committee May Beat Senate Group to Oil Probe

At a closed session of the Senate investigation committee, April 14, Commodore A. F. Carter, head of the Navy's oil activities, reported that the Navy Department favors construction of the Saudi Arabian pipe line because it is the "best proposed yet" to obtain increased supplies of oil for the armed forces.

Chairman Francis Maloney of Connecticut disclosed that the committee hopes to begin its open hearings toward the end of this month, with Secretary Ickes as the first witness.

The House interstate and foreign commerce oil subcommittee, however, may be at the special Senate committee in dissecting the PRC project. Representative Clarence F. Lea of California announced April 14 that the group, of which he is chairman, will open hearings April 19 to investigate black-market operations and their effect upon civilian and war supplies.

Truck Replacement Parts

The WPB is setting up authority for manufacture of additional quantities of automotive replacements needed to keep essential civilian transport in operation.

An amendment to the limtation order covering parts will permit manufacturers to set aside a part of their productive marchine-hours for the production of parts for civilian use.

The order will not provide the complete answer to the problem of truck replacement parts, but will help.

Engineers Discuss Varied Corrosion Problems in First Annual Meet

By ELTON STERRETT, Staff Writer

THE first annual convention of the National Association of Corrosion Engineers, held in Houston April 10 to 12, drew a total of 265 engineers and manufacturers interested in halting corrosion of pipe, cables and other underground structures. A total of 26 technical papers filled the general sessions, covering such important topics as internal corrosion of gas-condensate-well tubing, methods of checking, evaluating and applying cathodic protection, and the use of special alloys and protective coverings to mitigate loss of metal.

The annual convention ratified the tentative setup which had been functioning, returning the temporary officers to duty for a full year as duly constituted leaders of the association. Those elected were R. A. Brannon, Humble Pipe Line Company, Houston, president; F. J. McElhatton, Panhandle Eastern Pipe Line Company, Kansas City, vice president; O. C. Mudd, Shell Pipe Line Company, Houston, secretary-treasurer. Members of the newly created board of directors are G. R. Olson, United Gas Pipe Line Company, Shreveport; Robert Pope, Bell Laboratories, New York; Lyle R. Sheppard, Interstate Natural Gas Company, Monroe, Louisiana; Guy Corfield, Gas, Los Angeles; and Walter F. Rogers, Gulf Oil Corporation, Houston.

Tentative selection of Kansas City as host city for the next convention was announced, pending completion of arrangements for accommodations and selection of a date not conflicting with other technical meetings.

Use of Zinc for Cathodic Protection

By H. W. WAHLQUIST,
Ebasco Services, Incorporated, Chairman, Committee on the Use of Zinc.

Use of zinc as a current source in cathodic protection of pipe lines has a number of advantages where soil conditions are favorable. Since zinc anodes serve both as current source and as a ground bed, the problem of maintaining large masses of metal is avoided. Zinc anodes provide protection to coated lines in congested areas without introducing problems of interference.

Lack of information on long-time performance of zinc in the various types of soil is the most important disadvantage.

The report takes up the character of corrosion products on zinc anodes buried in various types of soil; changes in film potential; effect of impurities in zinc anodes; local-action currents from different soil strata; effect of current density on behavior of zinc anodes; use of chemicals in the soil to reduce tendency of the zinc to become passive under unfavorable soil conditions; evaluating each factor as contributing toward or hindering effective protection of the pipe.

Test data from zinc-protected lines of Colorado Interstate Gas Company and on zinc-protected lines in Houston are described and results compared with those obtained on special test zinc plates buried in artifically compounded backfills to provide gradations of soil resistance. Exaggerated losses resulting from local-action currents in certain types of backfills were evaluated. Best performance was given by a plate backfilled with clay mud mixed with powdered gypsum, other units in which crushed gypsum wall board was mixed with clay also showing well. Gypsum seems to counteract the formation of carbonate films on the zinc surface and thus helps maintain the desired density of current for protection of the line.

A Field Experiment with Magnesium Rods

By G. R. OLSON,
United Gas Pipe Line Company.

The search for inexpensive metallic materials for control of corrosion in pipe lines has involved many beside zinc, a section of 6⅝-inch pipe near Gregory, Texas, benig selected for the test with magnesium rods. The pipe was badly corroded.

The magnesium rods, 1.3 inches in diameter and 5 feet long were located 8 feet from the line, in 1½-inch holes drilled to 7 feet and filled with soft mud. The rods were forced to the bottom in the mud to obtain good soil contact.

Check of current output of the rods, taken 5 months after the installation, showed many of the rods had become ineffective, and attemps to pull them were unsuccessful. Replacement rods, 4 inches in diameter and 6 inches long, were placed in canvas bags with lime filling.

The tests, although disappointing, indicate that magnesium goes into solution much more rapidly than the theoretical value of 8.7 pounds per ampere year. Magnesium should have several advantages over zinc, particularly in higher-resistance soils if a method could be found to reduce the weight loss to a value approaching the theoretical.

Design and Construction of Tap-Changing Transformers for Cathodic Protection

By E. G. GODDARD,
Jefferson Electric Company.

Direct current for cathodic protection to prevent corrosion must be of relatively low voltage and amperage and may be obtained by using a bridge type rectifier of the dry disc type and a transformer to reduce line voltage for the rectifier desired.

Recommended design for the remote control systems desired for line protection was described. Where the commonly grounded supply system is used, use of a two-winding type of transformer permits complete isolation of the high-voltage A.C. current, leaving only the secondary or direct current of 15 volts or less exposed to possible contact through leads to the pipe line.

Fuses or breakers to protect the transformer in case of internal or external short circuits were advocated as was inclusion of moisture and acid-resisting insulation.

The Importance of Internal Corrosion of Tubing

By T. W. JOHNSON,
Union Producing Company.

Evidence of internal corrosion of tubing and well-head connections in gas-condensate wells warrants the attention of both operating and research departments. Operating organization should have knowledge of the existence of corrosion before faced with failure of equipment. Repair of a well, after parting of a string of tubing, for example, may cost heavily and may cause an equally serious monetary loss through off-production time.

The rate of internal corrosion might be correlated with the increase in temperature and pressure of the gas and if this be the case then deeper wells with high tmperatures and pressures, likely mean increased operating difficulties and expenses if some satisfactory solution be not developed. Well-head internal corrosion in gas-condensate wells is a part of the broad field of pipe-line corrosion since the tubing and well-head fittings are the first links in the transportation system.

Some Studies of Waters Produced By High Pressure Wells

By WALTER F. ROGERS,
Gulf Oil Corporation.

Analyses of water from gas-distillate wells have been made in search for a solution of the problem of tubing and well-head fittings corrosion. The ions usually found in oil-well waters are present in these waters and the order of concentration is the same, with sodium greatest, calcium next and magnesium third.

A portion of water produced by gas-distillate wells is undoubtedly condensed from water vapor in the high-temperature gas stream. High purity of this water accounts for the low dissolved-salt contents found in many condensate-well aqueous fluids. The connate water contains the usual and typical salts. Some of this water may be carried from the reservoir by the produced hydrocarbons in the form of droplets which become absorbed in the condensed water and contribute the dissolved salts.

Development of acid condensate waters by carbon dioxide through a series of tests showed that corrosion in equipment of high-pressure wells is primarily caused by water made acid through solution of carbon dioxide from the gas. On this basis, one remedy is alkaline treating materials used to raise the pH of the water to at least 8.0. Even under this condition some corrosion may be expected because of the high temperature and velocity of the gas.

There may be apparent anomalies which on the basis of incomplete data do not conform to any consistent corrosion theory. When the facts as to the gas carbon dioxide content, the area and amount of water precipitation and the temperature are known, the corroded areas will be found to be a function of these factors.

A Study of Corrosion in Gas and Condensate Wells in the Katy Field

By F. W. JESSEN,
Humble Oil & Refining Company.

Study of sufficient samples of fluids from two wells in the Katy field over a 3-months period justify some postulation on the mechanism of corrosion. The factors of prime importance are: (1)

production rate of gas, hydrocarbon distillate, and water; (2) reservoir temperature and pressure; (3) well-head flowing temperature and pressure; (4) well-head shut-in temperature and pressure; (5) composition of gas; and (6) composition of produced or condensed water. Other factors possibly contributing are variations in metal, such as slag inclusions, stress and chemical impurities; and certain electrical effects such as streaming potentials and stray-current electrolysis.

Derivation of values were plotted to determine whether a definite relationship existed between the dissolved carbon dioxide, pH, bicarbonate ion and rate of flow.

The data indicate that corrosion of steel may be correlated with the flow of gas which in turn is believed to contribute largely to the rate of absorption of carbon dioxide. The rate of reaction of dissolved carbon dioxide with steel at the pressures and temperatures encountered in the operation of gas-distillate wells seems dependent on the rate of absorption of carbon dioxide and time the fluid film is in contact with the metal.

The Need for a Method of Detecting Internal Corrosion

By T. W. McGUIRE,
Cotton Valley Operators Committee.

Parting of strings of tubing in the Cotton Valley gas-condensate wells evidences concentrated corrosion immediately below the well-head fittings.

There is need for an instrument, which lubricated into the well while under normal pressures, would determine corrosion or pitting acion in the tubing string. Conditions in the well bore in high-pressure gas wells leave a feeling of insecurity relative to practical control. Killing a well with parted tubing is considerably more damaging than killing a well with tubing intact.

A tool for determining internal tubular corrosion and initial field tests is mechanically operated and is lowered into the well on a wire line. Results indicate that the tool has merits.

Proposed Methods of Detecting Internal Corrosion

By T. B. McDONALD,
United Gas Pipe Line Company.

Possibilities inherent in an electrical device developed to determine variation in diameters caused within tubing by corrosion were discussed. This unit should be rugged, simple, and designed to offer a minimum of influence from stray currents and magnetic fields, yet sensitive enough to respond to small pitting. A unit has been made with the limitations of tubing diameter and operating temperatures considered, and limited tests indicate it will work. By use of an oscillograph such a device would indicate deviations from smooth contour. Such markings, when correlated with the speed of the device down the tubing and the rotation speed, would effectively fix the location and extent of the pitting. A motor will have to be developed to enter the tubing and withstand a temperature of around 300° F. A four-conductor cable capable of supporting 2 miles of its own weight in addition to the unit is required.

Estimates of Corrosion Rates By Chemical Analysis

By E. A. BROWN
Lone Star Producing Company

Corrosion of well-head fittings in three fields was such that some Christmas tree fittings required replacement after 3 months. Inlet separator waters showed iron content of from 200 to 300 p.p.m., and while early visual examination disclosed no localized corrosion, later deterioration bore out evidence of the chemical analyses.

At the outset all samples were withdrawn through a needle valve in a bushing in the lower part of the tree, and involved the passage of the water through an involved 2-inch piping hookup. Later, adapter flanges with tapped outlets were installed ahead of the tubing-crown valves to permit sampling at both points. Analysis of water from both points indicated little or no Christmas tree corrosion if the two checked, but if the downstream sample showed higher iron content—after adjustment for additional condensation of water vapor through the extended flow system—well-head fitting corrosion was indicated.

Serious internal corrosion of Christmas tree fittings is evidenced by produced water having an iron content of 100 to 500 p.p.m. or more. Little, if any, corrosion occurs in wells which produce water having an iron content of 50 p.p.m. or less.

Chemical tests have definite limitations, but also definite values, in attempting to estimate corrosion rates.

Additional information on localized corrosion may be obtained from water samples taken at various points along the flow lines, and determining increments in the amounts of dissolved iron between sampling points.

Experience in Use of Electronic Coating Inspector

By L. A. HUGO
Phillips Petroleum Company

Holiday detectors are in general use for determining continuity of coatings on pipe lines before being lowered into the ground. Damage sometimes occurs to the coating during lowering or backfilling, with resultant rapid deterioration of pipe. An instrument described by Dr. J. M. Pearson includes a microphone hummer operating off dry batteries, giving 1000-cycle supply to the pipe through one lead, the other being buried approximately 100 feet from the pipe. The current carries along the pipe, being concentrated at points of low resistance in the coating and producing voltage peaks above such locations. Locations are spotted by two men, one carrying an amplifier and indicating meter, the other providing reference ground connection. Both men wore shoes with metallic cleats, connected to amplifier shielding and amplifier input, respectively.

Approximately 80 locations were determined, 11 inspection holes being dug by the instrument crew, the others checked later. At 5 of the 11 excavations, visible damage to coating was evident, while the other 6 showed spots in which the thinness of the coating formed potential hot spots.

The instrument shows great saving in eliminating the uncovering of line having good covering.

A Method for Studying Anodic and Cathodic Areas Under Cathodic Protection

By OTHA C. RODDEY and
LYLE R. SHEPPARD
Interstate Natural Gas Company

Often when cathodic protection is applied results are not as predicted due to inadequate understanding of the corrosion problem, and not to failure of the protection method.

A corroding unit composed of two electrodes in a single electrolyte can be used. One electrode is made anodic and the other cathodic by an external battery. The corroding currents may be controlled by external resistances. A controlled protecting unit is combined with the corroding unit to make the studies. Such an instrument allows studies to be made of electrical reactions and current distributions on the surface of both anode and cathode while under cathodic protection.

The anodic area, being smaller than the cathodic area, is the main controlling factor in current flow. The colorimetric method (using potassium ferrocyanide for iron electrodes), for determining the protection point in a solution probably is more accurate than the weight-loss method. At full protection the corroding anode and cathode have equal interface resistances and polarizations. The electrolyte increases in alkalinity and electrical conductivity with both increased protection and time. Tests in limited spaces should not be taken to give absolute values for use in unlimited spaces, but only to show trends. Time is a factor not properly considered in cathodic protection.

Tests on Buried Pipe Samples Showing Relations of Galvanic Couples to Cathodic Protection Current and Potentials

By M. C. MILLER
Ebasco Services Incorporated

Buried pipes were arranged so that location of the anodic and cathodic areas would be known; also their areas, open and closed circuit potentials, their resistances to remote earth and to each other, and the amount of galvanic-current flow between them. With this arrangement, the division of cathodic-protection current to the anodic and cathodic areas was determined accurately.

In charting the data, two outstanding facts appeared in each set of tests: (1) when the net current flow from the anode was reduced to zero by the cathodic protection current, the potential of the structures to the three reference electrodes were practically the same and equal to the open-circuit potential (or static potential) of the anode. (2) The relative relationship of the structure potential to the five reference electrodes. Measurements indicated whether the pipe was an anode or cathode and correlated with the measured flow of galvanic current.

Tests indicate that to stop galvanic currents and halt corrosion, it is necessary to change the measured potentials of the structure to remote earth or of the electrode near the anodes, so that they are equal to or greater (more negative) than the static potentials of the anodes. Therefore, if the maximum open circuit voltage of the anodes likely to be encountered along a specific pipe line in a particular soil could be determined, it could be used as a criterion for protection and probably would be more accurate than using —0.8 v for all conditions.

Coupling Bonding on Natural-Gas Lines

By F. J. McELHATTON
Panhandle Eastern Pipe Line Company

Where natural-gas lines are constructed with mechanical couplings involving rubber gaskets, it is necessary that the separate pipe lengths be electrically bonded if cathodic protection is applied.

Of five types of bonds described the

lowest resistance was found with one in which a flat solid-copper strip is provided with terminal plates, curved to fit the pipe. Field welding involves only the attaching of the steel contact or terminal plates to the pipe, the copper-steel joint being factory made. A galvanized steel wire also joins the terminal plates, being measured that it may be bent and welded to the followers and center ring of the coupling, including them in the circuit.

Since principal cost of bonding old lines is in digging and backfilling necessary holes at couplings, development of a power-driven auger greatly speeds the work and cuts the cost of the hole by 50 percent.

On new construction an armored gasket with built-in bonding provision is satisfactory.

Economic Factors of the Corrosion Problem

By H. C. GEAR
Lone Star Gas Company

Economic features of the corrosion problem are so closely associated with depreciation that they bear out the relationship of cause and effect to the extent that the two are practically synonymous. Diminution of service life due to the selective and concentrated attack of corrosion causes mortalities of units of pipe.

Problems in Pulsating Currents

By BETHEL BOND
Texas Pipe Line Company

Certain problems encountered in dealing with pulsating and alternating currents may broadly be considered as A.C. phenomena, commonly though somewhat erroneously considered as non-corrosive.

Cited were cases in which A.C. or pulsating peaks from D.C. equipment caused corrosion, with study of wave shapes in protective current from disc and plate types of rectifiers. A "peak" type voltmeter shows that such peaks or pulsations occur in the neighborhood of the rectifier, but the condenser effect of action between pipe and soil tends to smooth the D.C. ripples to the extent that they are equivalent when read on the special "peak" voltmeter and a D.C. unit, at distances of 3 miles or more from the current source.

Non-ferrous corrosion due to A.C. is probably more prevalent than is suspected in water-cooling systems, water lines and other systems where considerable amounts of non-ferrous metals are involved. In some cases this may be controlled chemically, though elimination of the current seems better.

No solutions were offered due to the fact that while the problems are known to exist, experience in solving them is limited, largely due to the unavailability of proper instruments. At present the only apparent source of an A.C. millivoltmeter is for the investigator to construct his own.

A Proposed Method for Remote Indication Of Cathodic Protection Unit Outages

By HENRY P. GRIGGS
United Gas Pipe Line Company

Continuous operation of a cathodic protection unit is necessary for satisfactory results. Manpower shortage makes it impossible to make frequent inspections of systems, and even with inspection to be sure the unit will function continuously, some type of remote indication of failure is desired.

Such a system consists of a tuned oscillator to generate a signal, telephone line to carry the signal, and a tuned receiver to pick up the signal at the central location. The signals must possess characteristics that will not introduce any foreign noises into the telephone circuits nor act as drain on existing channels.

A tuned oscillator with every cathodic protection unit obtains selectivity of the generated signals through some such method as using a frequency separation of approximately 5000 cycles between various channels. Or oscillators could all be set at the same frequency, differentiation being obtained by having each unit impress its signal only during a specified interval. A third plan involves impressing a signal only when a unit ceases operation. This plan requires oscillators with different frequencies and involves use of an independent current source, such as a storage battery.

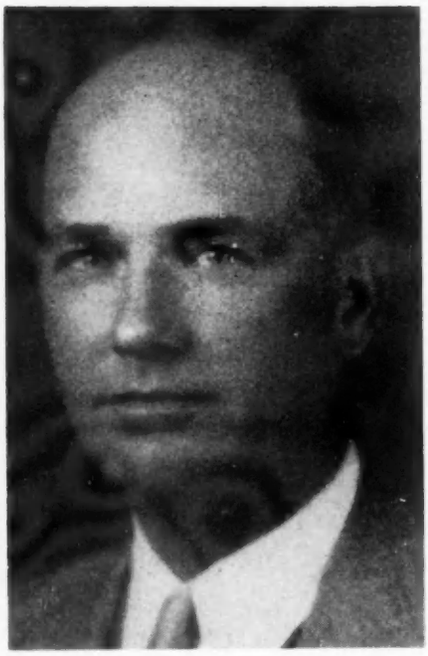
Asphalt Mastic Pipe Coating and Cathodic Protection

By GORDON N. SCOTT
Industrial Engineering Company

A truly continuous and lasting coating will save steel in pipe, as it is then necessary to design only for a reasonable factor of safety, assuming initial wall thickness throughout the life of the pipe. Practical requirements of design and certain structural deficiencies tend occasionally to disrupt continuity of the coating. Such deficiencies in the coating can often be repaired if known to exist and located or supplemented by cathodic protection. Asphalt mastic uniformly shows low conductance.

A formula was suggested from which the design of cathodic protection for lines coated with asphalt mastic could be derived, in which small anodes of relatively high resistance and high D.C. voltages are indicated as most economical. Carbon or graphite anodes, alkali cells or any of the chemical anodes now under test become attractive with the advantage of higher anode efficiency.

President of NACE



RUSSELL H. BRANNON

Natural Gasoline Group Re-elects All Officials

More extensive use of Natural gasoline and other light hydrocarbons in motor fuel had consideration at the twenty-third annual meeting of the Natural Gasoline Association of America in Dallas April 12, 13, and 14, as a means of counteracting loss in oil reserves.

All officials were re-elected: J. W. Vaiden, Skelly Oil Company, Tulsa, president; R. A. Carter, Continental Oil Company, Ponca City; H. A. Ells, Cities Service Oil Company, Bartlesville, and C. R. Williams, Chicago Corporation, Corpus Christi, and H. H. Beeson, Sabine Valley Gasoline Company, Shreveport, vice presidents; William F. Lowe, Tulsa, secretary.

Officials of Natural Gasoline Supply Men's Association are: A. M. Buxton, Cooper-Bessemer Corporation, Tulsa, president, Fred Wetzel, Ingersoll-Rand and R. E. Walker, American Rolling Mill Company, Tulsa, vice presidents; John Heinzerling, Vinson Supply Company, Tulsa, treasurer; William F. Lowe, secretary.

Third Former Oil Weekly Employee Dies in Service

Word has been received in Houston that Lieut. A. R. Mace, formerly in the advertising department of THE OIL WEEKLY, who entered the United States Air Force eighteen months ago, has been killed in action over Italy. He was 28 years old and leaves a widow and an infant daughter.

This is the third war loss among former employees of THE OIL WEEKLY. In November Lieut. (jg) Ray L. Dudley Jr., oldest son of the publisher, who had done some work in the editorial department, died in the United States Naval Hospital in Brooklyn. On December 31, Lieut. Bayard T. G. Dudley, second son of the publisher who had, in vacation periods, worked in various departments of THE OIL WEEKLY, was killed while piloting a Fortress over France.

Moley Will Speak at IPAA Director's Meet

Raymond Moley will be the principal speaker at the mid-year meeting of the board of directors of the Independent Petroleum Association, at Bradford, Pennsylvania, April 27, 28, and 29. He will talk on "The Political Outlook" at a luncheon meeting of the directors Saturday.

The three-day meeting of the directors will place special emphasis on secondary-recovery operations and a national oil policy. Merle Becker of St. Louis, chairman of the program committee, has announced that Governor Edward Martin of Pennsylvania will talk on "The Oil Industry and the State," at a luncheon meeting Thursday. J. D. Sandefer, Jr., of Breckenridge, Texas, president of the National Stripper Well Association, will speak at the luncheon on "The Stripper Well Operator and Secondary Recovery."

Field trips, for inspection of secondary-recovery plants in the Bradford area, are scheduled Thursday and Saturday afternoons. Friday sessions will be devoted to discussions on secondary-recovery operations.

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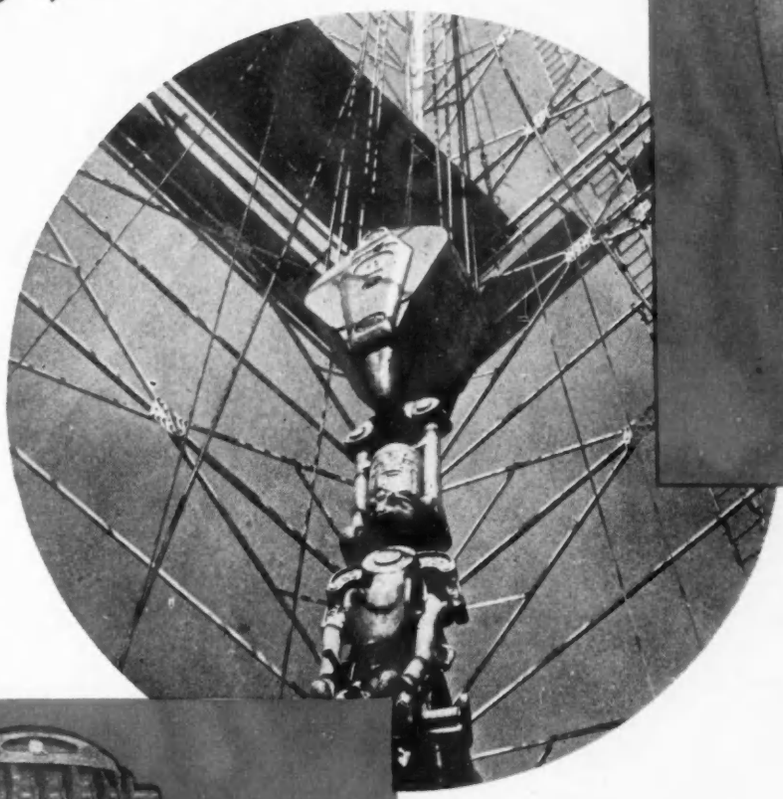

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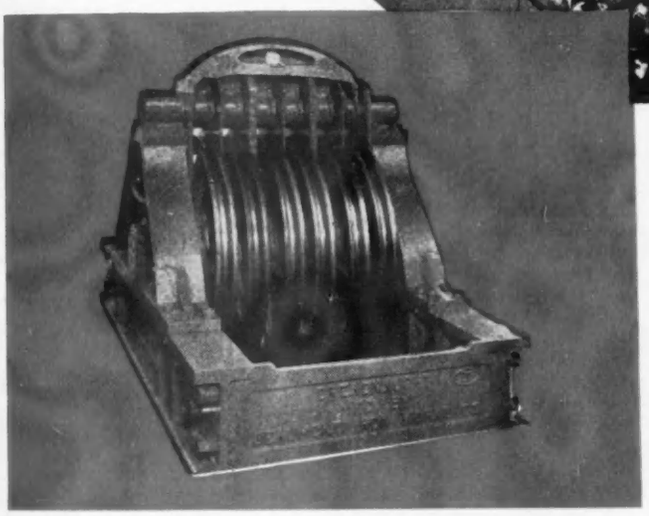

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Full Exchange of Views Is Urged At Eastern API Meeting

By A. R. McTEE, Staff Writer

Stressing the importance of oil and gas producers sharing their problems and benefits while anticipating the future as much as possible, through discussion and exchange of views and experience, the wartime conference of the Eastern District Division of Production of the American Petroleum Institute, met in Columbus, Ohio, Wednesday, Thursday and Friday of last week. Efforts of the industry to provide oil and gas for the war were the principal theme. The necessity of close attention to all technical aspects of the production branch of the industry at a time when abnormal handicaps have to be met constantly was voiced by speakers. Declining discovery rate makes it imperative to concentrate more intensively on getting the most yield from known fields, and at the same time do as much exploration for new production as conditions will permit.

Robert Allen, publicity director of API, urged developing a better understanding in the public mind about the industry and the pivotal part oil is playing in the war. He suggested that oil companies begin with their own personnel in promoting a broad program of better public relations and stressing the vital functions of oil both in relation to civilian economy and the war effort. He foresaw disappearance of many of the "petty persecutions" of the industry as a more sympathetic feeling develops in the mind of the average layman. "Victory is within our grasp," he said, being speeded through the use of oil and its products. The public should be informed of this and be brought to a greater appreciation of the fact.

High tribute was paid the oil and gas industry for its war time achievements in supplying petroleum products for military needs by Lieutenant Governor Paul H. Herbert of Ohio at the annual banquet Thursday. Private initiative and enterprise are solely responsible for the advanced technology which has made possible the progress of oil and gas production, he stated.

New officers elected for the Eastern District for 1944-45 were: V. F. Bowyer, Peoples Natural Gas Company, Pittsburgh, chairman; R. B. Anderson, Columbian Carbon Company, Charleston, West Virginia, J. V. Goodman, Equitable Gas Company, Pittsburgh, I. W. Hartman, Gordon Oil Company, Mt. Pleasant, Michigan, R. J. Sullivan, The Carter Oil Company, Mattoon, Illinois, S. M. Vockel, Waverly Oil Works Company, Pittsburgh, and J. E. Schaefer, East Ohio Gas Company, Cleveland, vice chairmen; and K. C. Cottingham, Ohio Fuel Gas Company, Columbus, secretary-treasurer.

Applied technical research and then more research must be used to solve "maturity" pains in secondary recovery, ruled A. F. Booth in his paper on "Economic Phase of Secondary Recovery by Water Flooding in the Bradford Field." After all present known methods are exhausted, there is still an "enormous objective at which to shoot in the amount of oil left in these sands. Figures tend to show that the residual oil, even after flooding, amounts to more per acre than has been removed by both primary- and secondary-recovery operations combined. In round numbers an average for the field of better than 7000 barrels to the acre. That means a residual-oil total of well over 500 million barrels. The answer to this problem is applied technical research. Go and hire a good petroleum engineer to interpret these ideas and adapt them to conditions on your individual property."

Incentive and Effort

Development of the American oil industry, as brought out by L. G. Huntley, consulting geologist of Pittsburgh, can be traced to the "intricate play of competition, cooperation, and using the skills and techniques of many branches of science and technology, not to mention those of both horse trading and the law. But all this is founded upon the fact that the rights of the subsoil are vested in the owner of the land. This gives the oil man a manageable commodity in which he can trade and maneuver, and make use of his native imagination and skill and whatever other qualities he may have, in order perhaps to bring in new oil reserves to his own and others' profit. In other words, incentive to individual effort."

He sketched the progress of prospecting and development in Mexico, Venezuela, Columbia, Peru, Bolivia, Argentina, Canada, France, Germany, Roumania, Russia, Irak and Arabia, Persia, the East Indies, and China, illustrating the retarding effect of government restrictions and nationalization of producing efforts, on the growth of the oil industry in these countries. In Mexico, for instance, since expropriation and operation of the industry there by the Mexican government, he stated that "production has been steadily declining, the government has consistently lost money, the products are progressively of lower quality and higher price, production is barely sufficient for domestic consumption and are receiving lower wages."

In Venezuela, the initiative of a company with headquarters in the United States, in cooperating with the Venezuelan government and also with competing companies in helping to formulate a new petroleum law for that country, has greatly aided in its oil development, Huntley pointed out. Today American interests control more than 80 percent of the proven reserves of the field. During the present war the production from Venezuela was the vital increment which may have saved us from a fatal shortage in the early years; just as did that of Mexico during the first world war.

In Colombia, on the other hand, following development on the DeMares and the Barco concessions, "the whole matter became a political football and no one knew from year to year what the oil policy of the nation would be. In recent years, some of these matters have been ironed out, as the country after all is more nearly a democracy than any of the other Spanish American nations, with the possible exception of Costa Rica. The fact remains that the government control of the subsoil has put a brake on all development, and slowed down the general wildcatting plays which seem to be essential to full realization of the potentialities of a region.

Postwar Demand

In "Some Postwar Aspects of the Oil Industry," Sidney A. Swensrud, vice president of Standard Oil Company of Ohio, presented results of a study by Dr. C. L. Burrill of Standard Oil Company of New Jersey, on postwar demand. Conclusions from the study were, "that if the war should end in Europe in 1944 and in the Pacific in 1945, then we may expect a rapid and substantial decline from the wartime peak demands, but such decline would not for more than a year or so carry us to levels below those of 1941. With respect to gasoline, for example, it is estimated that in 1946 the domestic gasoline demand will average approximately 1,700,000 barrels daily, or about 8 percent below the figure of 1,840,000 barrels daily for 1941. By the following year Burrill estimates that the same gasoline demand would have increased to a little over 2,000,000 barrels per day or about 10 percent above 1941, and that by 1950 it would have risen to approximately 2,300,000 barrels daily.

Estimated demand for various other products is much the same. Burrill sees, against the total demand of approximately 4,400,000 barrels daily for all petroleum products in 1941, and a wartime peak of about 4,800,000 barrels daily, total daily demand beginning in 1946, as follows: 1946—4,200,000 barrels daily; 1947—4,600,000 barrels; 1948—4,850,000 barrels and 1949—5,000,000 barrels. Thus except for a brief period immediately following the war when total demand presumably will drop off substantially, the indications are that demand will go on to new heights.

To meet these unprecedented requirements the speaker gave this picture of output: "So far as crude oil supply immediately following the war is concerned, there is hardly likely to be any problem, since it appears probable that our requirements for domestic crude oil in this period will decline by perhaps 6 or 8 hundred thousand barrels per day. As mentioned earlier, it is estimated that the total demand for petroleum products in 1946 will be approximately 600,000 barrels per day less than at the height of the war, and it is reasonable to suppose also that after the war, when tankers are more freely available, crude oil imports into the United States and Canada from South American sources will increase, thus further lessening the demand for United States crude oil."

In touching upon postwar disposition of the big-inch pipe lines, Swensrud said that against the rather "unpre-

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possessing prospect for use in petroleum or product service, is the fact that at or near the source of the lines lies the greatest developed gas reserves in the world, for much of which there is at present no satisfactory market outlet, and at the other end of the lines lies one of the greatest concentrations of population in the world, which is not now served by natural gas."

Use of Portable Gas Compressor Units Reciprocating Type

By PAUL E. DUFENDACH,
Kentucky-West Virginia Gas Company

A critical shortage of gas supply is imminent in the Appalachian field and all methods must be employed to conserve existing gas reserves and utilize facilities there.

Portable gas compressor units may be used economically in exhausting gas reserves in small isolated fields or partly depleted areas and in expediting salvage of equipment. Total recoverable gas reserves and the possible rate of withdrawal determines the type of installation. Factors other than whether or not the amount of gas so recovered will warrant operating cost of the units should also be considered. Exhausting wells more rapidly and shortening their life means a savings in overall total operating costs. Frequently where gas is encountered in shallow formations when drilling for deeper production, a portable compressor unit might expedite recovery of the gas so that drilling could proceed earlier.

Units also might replace larger compressor equipment in fields which have become largely depleted, the large equipment being moved elsewhere.

On small properties the portable unit assists in maintaining delivery ability to meet peak requirements. During periods of low delivery requirements, surplus gas production from one area or group of wells with a capacity for sustained delivery ability could be placed in storage.

Recovering Residual Gas with a Rotary Compressor

By GEORGE W. McKINLEY,
Engineer, Hope Natural Gas Company

Compressor installations to recover residual gas must be low in first cost and require little or no operating supervision and have low maintenance charges. Rotary compressors of the sliding-vane type seem to satisfy these requirements. Electric-motor-driven rotary compressors fully equipped and installed ready for operation, cost about $72 per horsepower. Salvage value if moved to a new location would entail a loss of only 10 percent of the original cost.

Each compressor is equipped with a force-feed lubricator. In order to eliminate auxiliary machinery, each compressor unit is equipped with a water circulating pump and a radiator, to which anti-freeze is added in winter. Compressors are directly connected to a motor drive and together with the radiator are mounted on a structural steel base which makes it semi-portable. Mercoid pressure and temperature switches protect units against overloading and overheating due to suction and discharge pressure conditions. An efficient dust separator in the suction lines is an absolute necessity, because dirt entering with gas will be thrown against the cylinder wall. Here it will break the oil film and cause excessive wear of both the blades and cylinder.

Underground Storage of Natural Gas

By E. G. DAHLGREN,
Technical Secretary, Research and Coordinating Committee, Interstate Oil Compact Commission.

Recent information on underground natural-gas storage installations in Arkansas, California, Kansas, Kentucky, Michigan, New Mexico, New York, Ohio, Oklahoma, Pennsylvania, Texas, West Virginia and Alberta, Canada, is given with estimates of 50 or more projects in operation with storage capacity of 135 billion cubic feet and delivering capacity of 750 million cubic feet per day.

Underground storage of natural gas has been demonstrated to be a necessary adjunct of natural-gas and petroleum companies in providing emergency reserves for meeting peak demands and meeting the needs of true conservation. Unitization or cooperative operation of storage reservoirs is desirable to eliminate waste and to save manpower and equipment.

Storage reservoirs enable long-distance pipe lines to be operated economically at full capacity.

Some Recent Advances in Well Treating Methods and Equipment

By P. E. FITZGERALD,
Dowell Incorporated.

An electrically operated interface locater locates the contact point of different solutions by means of measured differences in conductivity. Position of the interface is determined by lowering the instrument into the well on a single conductor cable, the insulated copper core and the external steel sheath of the cable comprising the electrical circuit. The device when used in a well, locates and records at the surface on an indicator, the location of salt water-oil contact or acid-oil contact.

The interface locator can be used to determine relative values of permeable zones by obtaining quantitative measurement of fluid pumped into zones tested.

The device is also used in selective acidizing to keep the operator informed as to the exact location of the oil-acid level and by controlling it, selected zones can be acidized.

In selective acidizing operations the unit is seated in a standard seating nipple installed on the bottom of the tubing. Electrodes extend beyond the end of the tubing to a point near the top of the zone to be acidized. Chemicals are pumped down the tubing through the passages in the body of the unit and into the well below the electrodes. Oil is pumped down the casing simultaneously. In this manner an acid-oil interface is maintained and by varying the relative pumping rates of the acid and oil, as determined by the electrical meter deflections, the position of the acid in the well is accurately controlled, assuring the introduction of the chemicals into the previously selected zones.

Late Development in the Southeastern Gulf Coastal States

By H. R. BRANKSTONE,
Gulf Oil Corporation.

During 1943, the Southeastern Coastal States of Mississippi, Alabama, Georgia and Florida have experienced increased activity. Drilling, as a result of geological and geophysical work, has added to the general knowledge of the entire area. Mississippi has advanced more in this respect than have the other states, although developments in Florida have added a definite impetus to a wider field.

Regional structural features have been outlined by drilling so that the problem now is to work out the details. Geophysical methods are being used extensively and have been found to be well adapted to the problem. There have been some discoveries. Showings have been reported in formations deeper than those that yielded production. Advanced methods of exploration are being used and all available information is being accumulated and correlated.

Methods of Sand Study in the Appalachian Basin

By R. E. SHERRILL and D. A. BUSCH

Sand maps show the extent and thickness variations of a sand body. One and only one sand should be shown on any one map.

The first step in preparation of such maps is collection of available well records, samples, core analyses, and the location of the wells on a suitable base map.

Selection or construction of a suitable base map upon which to plot well-log data is the second step. In Southwestern Pennsylvania property line maps drawn to an approximate scale of 2000 feet to an inch are available.

When records are collected and as many as possible of the corresponding wells are located on property-line base maps, the next step is correlation. Any one sand is logged by several different names in different parts of the area and the same names are applied to entirely different sands. Correlation involves not only the determination of which sand in one log corresponds to a particular sand in another record, but also the determination of what takes its place beyond its limit as a sand.

When the correlation is completed, an individual work sheet of each sand is prepared by spotting from the base map the location of each well that has penetrated the horizon of that sand.

Contouring the thickness of a sand is done after available data are recorded on the work sheet.

These problems of collecting data, selecting or constructing a suitable base map, and correlation and contouring are the principal problems. Although the well logs are poor these problems can be overcome by patient utilization of all records. Individual sand maps are especially useful in secondary-recovery operations and in prospecting for new pools. For the latter purpose it is desirable that the origin of the sand bodies be known.

Program Announced for Annual Scouts Meeting

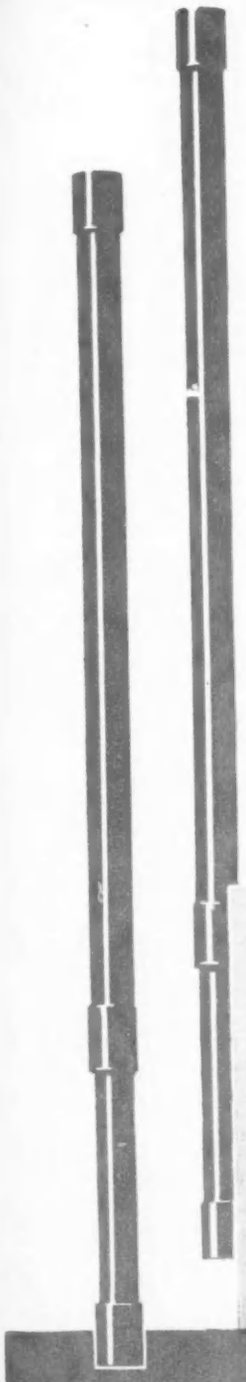
The National Oil Scouts and Landman's Association has planned a streamlined program for its 20th annual meeting, to be held at Hotel Adolphus, Dallas, April 24 and 25.

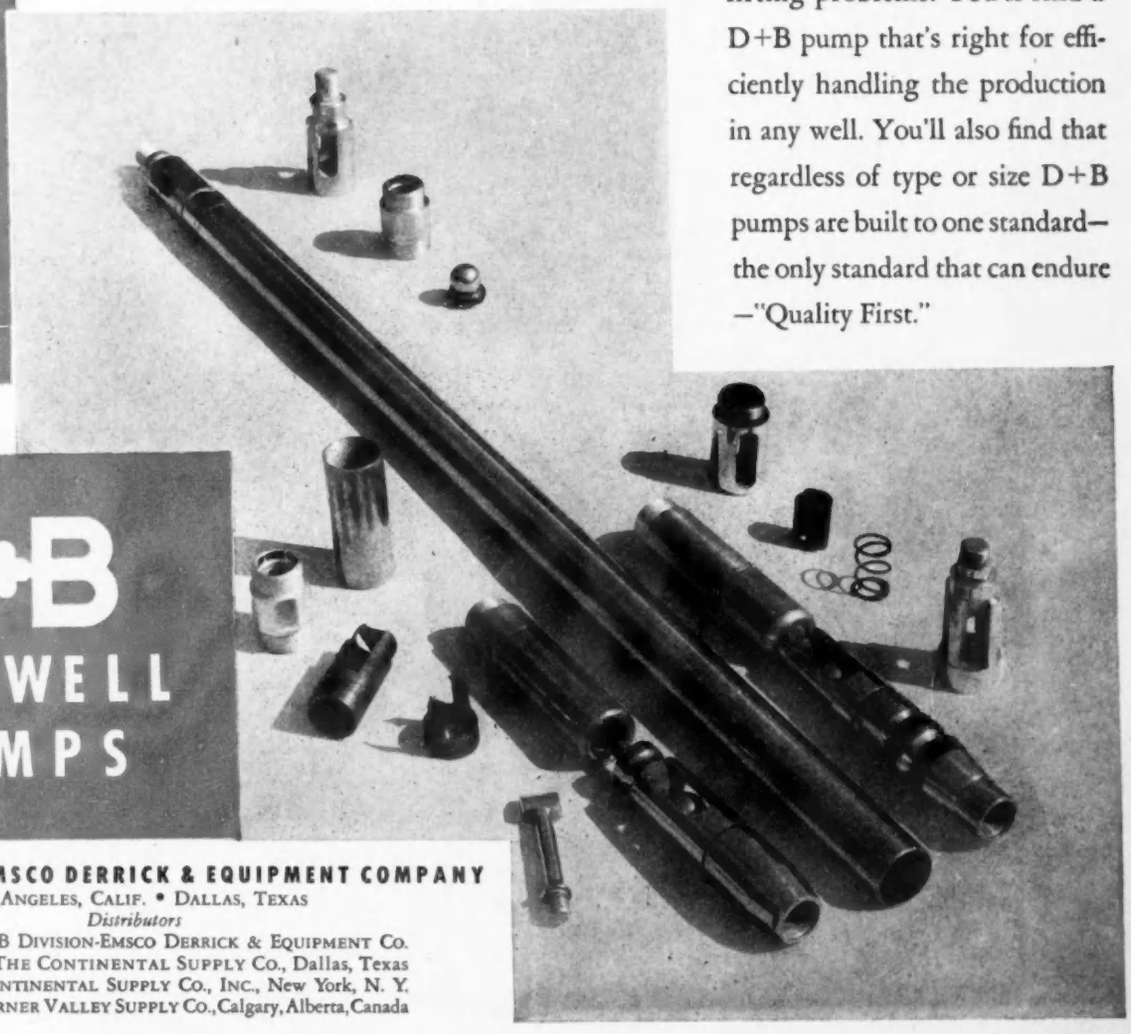
On the opening day, following registration and a meeting of the nominating committee in the morning, an afternoon session with Dell J. Crosby presiding, will hear Sidney Lee, Atlantic Refining Company, read a paper "A-B-C of Aviation Gasoline," followed by Dr. Frederic H. Lahee, Sun Oil Company, with a paper "Exploratory Drilling in 1943." The session will close with a motion picture, "Sulphur Mining."

From pump shell to fittings— one standard "Quality First"

There are men living who helped build the first D+B pump 43 years ago. There are men living who worked on the well in which it was run. That pump resembled the D+B pumps of 1944 only in basic design. It probably would last only an hour in a West Texas or Signal Hill well of today, but it was built to operate efficiently under the well conditions that prevailed in those times.

Today's D+B pumps are built the same way. As pumping conditions throughout world oilfields become more difficult, D+B is successfully developing better, more efficient pumps. They are designed and built in varying sizes, lengths, and styles. There are types for shallow and normal production, and others that are recommended for deeper tough lifting problems. You'll find a D+B pump that's right for efficiently handling the production in any well. You'll also find that regardless of type or size D+B pumps are built to one standard—the only standard that can endure —"Quality First."





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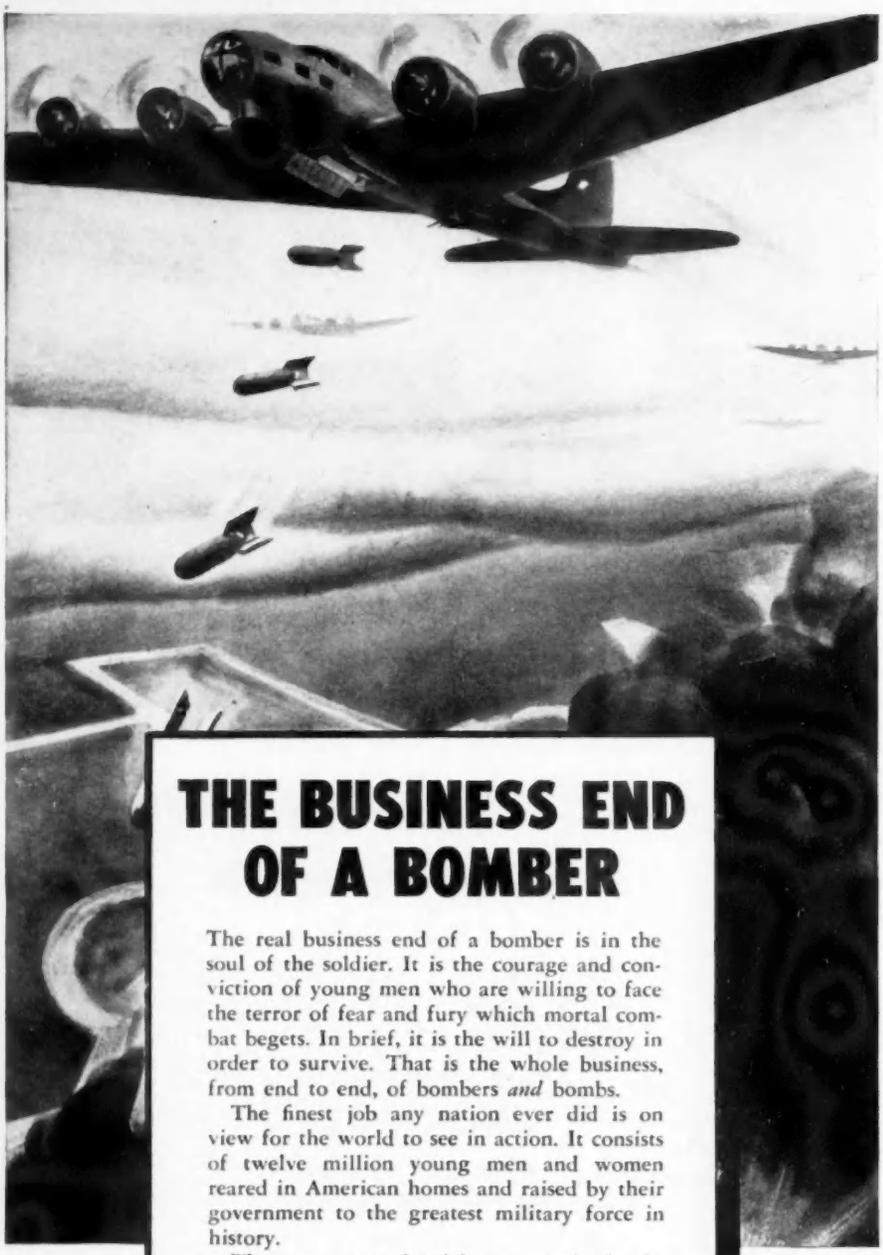

THE BUSINESS END OF A BOMBER

The real business end of a bomber is in the soul of the soldier. It is the courage and conviction of young men who are willing to face the terror of fear and fury which mortal combat begets. In brief, it is the will to destroy in order to survive. That is the whole business, from end to end, of bombers *and* bombs.

The finest job any nation ever did is on view for the world to see in action. It consists of twelve million young men and women reared in American homes and raised by their government to the greatest military force in history.

The next most inspiring spectacle is the quality and quantity of the equipment we have produced for these fighters. It is the very best and the most anywhere.

In this war, as in most other wars during the last ninety years, The Harrisburg Steel Corporation has gone all out in the making of the best munitions it knows how to make. It will be our happiest day when our bombs, all bombs, cease dropping. On that day, but not before, we will drop aerial bombs from our list of major products, which include: Seamless Steel Cylinders, Couplings, Pump Liners and Liquefiers, Drop Forgings, Drop-Forged Steel Flanges, Coils and Bends, Alloy and Carbon Steels.

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Germany Fights

■ CONTINUED FROM PAGE 14

1943. This would tend to decrease sharply the total figures on oil used.

It is well to recall that for many months, German propaganda has ceased to shout of three-fold, five-fold and even ten-fold air raid retaliation. Long before Allied raiders reached the 1000-plane-per-raid quota, and greater, the theme of manifold retaliation subsided and then disappeared. The facts of simple arithmetic must have become obvious even to Mr. Goebbels. A 1000-plane raid on a 10-hour flight will use in excess of 100,000 barrels of gasoline alone. Of all the petroleum products available to Germany in 1943, perhaps 75,000,000 barrels were in the form of gasoline. If only half of this was available to the air forces and, in turn, half of this half reserved for use of bombers exclusively, 180 major bombing raids a year would conceivably exhaust the German available (or visible) gasoline supply. All of this is based on the assumption that the oil industry of Germany is functioning without flaw, or doing business as usual. While there may be some wishful thinking here, the trend of German propaganda would seem at least to bear it out.

Not Even Demi-tasse

Geologically, Germany is not in a favorable oil producing area. It is not in one of the "oil bowls" of the earth, to borrow a term from Wallace Pratt, such as the Persian Gulf area or the Caribbean area. By comparison it is not even a "demi-tasse" cup. If Roumania is lost the heavy duty of supplying the German armed forces falls on the synthetic plants.

If the Roumanian fields fall into Russian hands, the German oil supply will receive a grievous blow — a loss of from 35 to 40 percent. This loss in itself will not of necessity prove fatal to the war effort. With 60 to 70 million barrels a year of production remaining, this could maintain defensive war on a restricted front for a long time—provided, however, Allied bombing spares all synthetic plants, refineries and oil installations in German-held territory.

As the Fuehrer of Germany contemplates the probable loss of the Ploesti fields, perhaps he harkens back to a most ill-omened incident at the moment of one of his earliest triumphs. Just six years ago, according to G. E. R. Gedye (Central Europe correspondent for the Daily Telegraph, London), in his "Betrayal in Central Europe," on Friday night, March 11, 1938, German troops, armored cars and tanks invaded defenseless Austria. Down the highway from Munich to Linz toward Vienna they rolled in endless procession. Hitler was due in Vienna for his triumphal parade on Saturday evening. One hundred miles from the city, however, the tanks stopped, jamming the roads. The Fuehrer himself was stopped. On Sunday all traffic ceased. The Fuehrer was furious. It was not until Monday evening that Hitler himself was able to reach Vienna for his belated parade. The trouble? You guessed it! The mighty panzers stalled—they were *out of gas.*

Stocks of All Major Products Reduced

United States crude runs to stills were 81,000 barrels a day lower in the week ended April 8 than in the previous week, although still within 100,000 barrels of the all-time peak of early this year and 674,000 barrels or 18 percent above daily runs in the like week last year. They averaged 4,354,000 daily.

This cut-back in volume of crude charged to stills prevented adequate production of the major products and forced withdrawal of gasoline, light fuel oil, and residual fuel oil from stocks that should not have been reduced as they were.

The week probably brought the spring season turning point in the annual trend of gasoline storage, and steady withdrawals henceforth are to be expected. The stocks of finished and unfinished gasoline reached the year's probable peak of 89,162,000 barrels April 1 and by April 8 were down to 88,011,000, having decreased 1,151,000 barrels within the week. Last year the peak of 94,159,000 barrels was recorded March 20—a point 5,000,000 barrels higher than this year's April 1 level. On April 8, 1944, stocks also were about 5,000,000 barrels or 6 percent under the year-ago trend, although demand for gasoline is higher than a year ago. The industry obviously will have difficulty henceforth in fulfilling gasoline requirements. The week's draft on storage was accentuated by the cutback of 95,000 barrels daily in gasoline production, although that lower output was 30 percent greater than production in the like week last year.

Some stepping up of crude runs may be expected for the week of April 15, as crude production was increased 33,000 barrels daily in the April 8 week to 4,416,000 barrels, a figure only 20,000 short of the all-time record of mid-November last year, and 467,000 barrels or 12 percent above production in the corresponding week last year.

There was a continued draft on stocks of gasoil and distillate fuel in the week ended April 8, averaging 7000 barrels daily, but inventories at week-end were less than one half million barrels under a year previously in totaling 30,478,000 barrels. Production of the light fuel oils meanwhile was 36,000 barrels a day greater than in the previous week and 119,000 barrels daily or 21 percent larger than in the like week a year ago.

Supplying enough residual fuel oil remains a problem, and although production in the week of April 8 was 25,000 barrels a day greater than in the previous week and 128,000 daily or 12 percent higher than in the like week last year, there occurred a 36,000-barrel-per-day draft on storage. Stocks then stood at 51,072,000 barrels, and were 16 million barrels or 24 percent less than the 67,234,000-barrel inventory held on April 10 last year.

West Texas Line Proposed For Carbon Black Needs

Construction of a 60-mile pipe line to carry natural gas from the Texas Panhandle to carbon black plants now operating below capacity in the Panhandle area is under consideration by the chemicals bureau of the WPB.

WPB officials have been told that there is available in West Texas an additional 100,000,000 feet of gas daily of which the proposed line would handle 60,000,000 feet of gas daily, an amount sufficient for the 30,000,000 pounds of carbon black needed yearly. This would be enough to meet the 1944 requirements of the synthetic rubber program, but for the first quarter of 1945 it will be necessary to produce at least 100,000,000 pounds of additional channel black, which will require expansion of existing plants or the construction of new ones.

Crude Oil Production in the United States

(Estimates compiled by The OIL WEEKLY. All figures indicate daily averages, in barrels.)

STATE OR DISTRICT	PRODUCTION IN WEEK ENDED April 15	April 8
Alabama		25
Arkansas	79,200	79,100
California	829,150	825,550
Colorado	8,700	8,200
Florida	45	44
Illinois	221,900	220,400
Indiana	14,900	13,750
Kansas	277,500	257,500
Kentucky	20,200	21,200
Louisiana	358,600	359,250
North Louisiana	76,000	76,900
South Louisiana	282,600	282,350
Michigan	48,850	51,800
Mississippi	41,600	42,200
Missouri	100	100
Montana	23,030	24,420
Nebraska	1,200	1,250
New Mexico	113,000	113,050
New York	13,000	15,000
Ohio	8,350	8,850
Oklahoma	332,200	331,100
Pennsylvania	39,900	44,000
Tennessee	30	30
Texas	1,910,550	1,910,600
Upper Gulf Coast	518,750	519,000
East Texas Field	362,150	362,250
Rest of Eastern Texas	127,500	127,000
Lower Gulf Coast	198,100	198,050
Southwest Texas	75,300	75,500
South Central Texas	19,700	19,750
West Texas	374,100	374,050
North Texas	143,700	144,000
Panhandle	91,250	91,000
West Virginia	8,250	8,400
Wyoming	90,750	86,750
Total United States	*4,441,005	4,422,569

* All-time high. 5,165 bbls. more than the previous high of 4,435,840 bbls. of the week ended Nov. 13, 1943.

Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

(All figures in thousands of barrels—add 000)

HIGHS AND LOWS OF RECENT YEARS

ITEM	Crude Oil Prod. Barrels Daily	Week Ended	Runs to Stills Barrels Daily	Week Ended	Crude Stocks Barrels	Week Ended	Gasoline Stocks Barrels	Week Ended	Gasoil and Distillate Stocks Barrels	Week Ended	Residual Fuel Oil Stocks Barrels	Week Ended
Highs:												
1941	4,337	11-22	4,120	10-18	266,187	3-29	99,727	3-29	[1]54,983	11-15	102,448	1- 4
1942	4,337	2- 7	3,961	1- 3	263,208	3-28	[1]109,281	3-14	49,861	11-14	95,857	1- 3
1943	[1]4,436	11-13	4,331	12- 4	245,752	5-29	94,159	3-20	46,187	11-27	72,881	1- 2
1944	4,423	2-26	[1]4,453	1- 1	240,992	1- 1	89,162	4- 1	42,310	1- 1	57,330	1- 1
Lows:												
1939	[3]1,601	8-26	3,125	2-18	[2]229,127	10-12	71,152	10- 7	20,722	4-15	105,397	4- 8
1941	3,364	1-11	3,490	1-18	240,399	11-15	79,923	10- 4	28,381	4-12	90,914	7-12
1942	3,297	7- 4	3,393	5-23	231,896	12-12	75,934	12- 5	29,240	4-25	72,962	12-26
1943	3,821	1- 9	3,579	3-13	232,191	1- 9	68,182	10-16	30,732	4- 3	57,596	12-25
1944	4,357	1- 1	4,228	2-12	234,667	4- 8	76,302	1- 1	30,478	4- 8	51,010	3-18

TRENDS OF 1943 AND 1944

Trends in Week Ended:	Crude Oil Production Daily	Crude Oil Runs to Stills Daily	Crude Oil Stocks Week End	Gasoline Production Weekly	Gasoline Stocks Week End	Gasoil and Distillate Production Weekly	Gasoil and Distillate Stocks Week End	Residual Fuel Production Weekly	Residual Fuel Stocks Week End
1943:									
January 2	3,871	3,734	233,938	10,957	82,420	4,285	42,913	7,683	72,881
January 30	3,826	3,698	233,863	10,339	88,830	3,888	37,057	7,452	70,763
February 27	3,873	3,709	235,217	10,566	93,157	4,230	32,939	7,839	70,140
March 27	3,896	3,742	239,126	10,231	94,079	3,541	30,980	8,018	67,938
April 24	3,913	3,737	242,035	10,583	91,001	3,954	31,142	8,168	67,455
May 29	3,970	3,679	245,752	10,656	83,937	3,798	32,274	7,672	67,682
June 26	3,955	4,015	242,657	11,092	79,589	3,876	34,044	8,126	67,960
July 31	4,133	3,788	238,420	11,127	74,977	3,765	36,363	8,478	66,877
August 28	4,196	4,227	236,170	12,420	72,525	4,351	37,928	8,732	67,250
September 25	3,344	4,156	233,013	12,206	70,024	4,608	40,328	8,560	66,659
October 30	4,383	4,176	237,219	12,813	69,297	4,642	44,591	7,968	63,833
November 27	4,414	4,261	239,761	12,638	69,980	4,379	46,187	8,633	62,143
December 25	4,363	4,185	241,310	12,597	74,024	4,457	43,791	8,689	57,596
1944:									
January 1	4,357	[1]4,453	240,992	13,192	76,302	4,575	42,310	9,141	57,330
January 29	4,409	4,359	240,251	13,427	81,085	4,054	37,266	8,889	52,857
February 5	4,400	4,324	239,145	13,192	81,784	4,138	36,023	9,087	52,734
February 26	4,423	4,377	237,137	13,183	85,248	4,558	33,766	8,952	51,387
March 4	4,413	4,344	237,763	13,267	86,091	4,513	33,145	8,590	51,175
March 11	4,381	4,387	236,748	13,068	86,559	4,243	32,705	8,796	51,362
March 18	4,385	4,437	236,119	13,393	86,185	4,596	31,808	9,293	51,010
March 25	4,385	4,443	236,285	13,362	87,287	4,979	31,319	9,013	51,669
April 1	4,383	4,435	234,667	13,824	89,162	4,450	30,530	8,367	51,326
April 8, 1944	**4,416**	**4,354**		**13,161**	**88,011**	**4,702**	**30,478**	**8,541**	**51,072**
April 10, 1943	3,949	3,680	[4]239,864	10,091	93,410	3,884	30,970	7,644	67,234
Change:									
In week	+33	−81	−1,618	−663	−1,151	+252	−52	+174	−254
In year	+467	+674	−5,197	+3,070	−5,399	+818	−492	+897	−16,162
In year	+11.8%	+18.3%	−2.2%	+30.4%	−5.8%	+21.1%	−1.6%	+11.7%	−24.0%

[1] All time peak. [2] Lowest since April, 1922. [3] Lowest since October, 1922, due to shutdown of six Mid-Continent States. [4] Stocks, April 3, 1943.

●**Bendability, strength and toughness** of DEOXIDIZED Bessemer Seamless Pipe are illustrated here. Three tractors and a dragline on a barge are pushing this weighted section of 12¾" O.D. pipe across a lagoon in Louisiana. The longest shove made was 22,352 feet. In spite of the large number of 1500-pound concrete weights, the pipe showed no ill effects from this added load.

●**Superior welding qualities.** Because of the low carbon content of DEOXIDIZED Bessemer Seamless Pipe, it speeds up welding operations and assures better welds.

Note these Important Characteristics

In the following features, comparisons have of necessity been made with basic open-hearth steel of the *same tensile* strength. This has not been done to minimize the well-known features of that steel, but to indicate how, in the case of certain applications, DEOXIDIZED Bessemer steel offers definite advantages.

★ **Permits higher design or working stresses** because ratio of yield strength to ultimate strength is considerably greater.

★ **Better welding qualities** because of low carbon content.

★ **Lasts longer** under dynamic conditions of loading. Has a higher "endurance limit."

★ **Ductility and toughness** are fully equal to those of steel of the same tensile strength.

★ **Ideally suited for bending.** Has higher resistance to failure by buckling. Permits higher design loads.

★ **Fine grain structure.** Minimum of inclusions. Is cleaner.

●**Dependable.** No chances can be taken on pipe when it goes into underwater service. DEOXIDIZED Bessemer Seamless Pipe has already been proved safe and dependable in jobs totaling hundreds of thousands of tons.

UNITED

U. S. Field Operations

Oklahoma

Large Potential Area Asked As West Edmond Year Old

West Edmond, in Central Oklahoma, most important oil find in the state in 1943, celebrated its first birthday April 7 with outpost wells apparently in line to extend production south and northwest. The field has produced 1,292,000 barrels of oil (restricted), has 37 producers in the Bois d'Arc section of the Hunton lime which is the principal producing horizon, one in the Bartlesville zone, and has had only one dry hole. There are 24 drilling wells, 4 waiting on cement, 4 fishing and 11 locations on which 10 are rigging up. This is exclusive of testing and outpost wells.

The geology of the West Edmond pool is still being unfolded although the trend is toward classifying it as a stratigraphic trap, The field has not yet reached the stage where all the answers can be given and interesting studies under way have bearing on future exploratory work. Late in January West Edmond production was extended into Canadian County, to list that county among Oklahoma's oil producers for the first time. This well came in flowing 121 barrels of oil an hour and was pinched back to the field's allowable of 300 barrels per day.

Official cognizance of the area's potentialities was taken by Walker T. Pound, conservation officer for the Oklahoma Corporation Commission who seeks to include an additional 67,840 acres in Oklahoma, Canadian, Logan and Kingfisher counties within prospective future boundaries of the pool to be subject to the field's 40-acre spacing rule. The pool may be said to have approximately 40 feet of pay in seven proven sections roughly defined as extending from the south line of N½ 5-13n-4w up to the north line S½ 20-14n-4w. Least promising from an extension standpoint is the eastern area although a 20-barrel well has just been completed in Section 34-14n-4w, 1½ miles from Hunton lime production. Two miles north and slightly east of this test, F. C. Hall's McKee 1, C NW SW 23-14n-4w, is nearing the testing stage, topping the Checkerboard lime at 5440 feet, much higher than the Holmes 20-barrel producer, while 3 miles south of the field Denver Producing & Refining Company's Bailey 1, C SW SE 19-13n-4w, was drilling below 6000 feet and readying for a test.

Cleveland County: Perforating casing at Mid-Continent Petroleum Corporation's Tubbs 1, NE SW SE 29-10n-3w, east offset to the discovery well in the West Moore pool has been delayed on account of bad roads. This test is being drilled tight and it has aroused considerable interest. The well is reported to have cored nearly 100 feet of saturated Wilcox pay topped at around 8800 feet. The company has staked two more wells in West Moore, Tubbs 2, NE SW NE 29-10n-3w, a location northeast of the discovery well, and Mullins 2, NE SW SW 29-10n-3w, west offset to the discovery.

Cotton County: Another oil pool for the Walters area in Southwest Oklahoma loomed as Red Bed Royalty Company's U-Tah 1, SW NW SW 14-1s-10w, prepared to run 7-inch to 2140 feet after reporting good sand and gas and oil shows at 2211 feet. The test is north of the Walters gas field.

Washita County: Gulf Oil Corporation's Hare 1, NE SW 8-8n-20w, on a five-minute drill-stem test filled 360 feet free oil from the Granite Wash formation. Tool was pulled when it looked as if the well would flow and operator is drilling below 6000 feet before testing.

McClain County: Carter Oil Company's Cottingham 1, C SE SW 4-7n-3w, deep Wilcox sand pool opener in the Anadarko Basin, will squeeze perforations at 10,625-50 feet to shut off salt water believed to be coming from the last 5 feet of the producing formation. After flowing 1215 barrels of oil and 205 barrels of water in 28 hours two weeks ago the salt water increased until the well was making 22 barrels of oil and 16 barrels of water in a 7-hour test through ⅛-inch tubing choke before it was closed in. A squeeze job is also planned at the company's Johnson Ranch 1, C SW NE 13-8n-4w, 4½ miles northwest of the Cottingham well. Tests in the Wilcox and Hunton zones proved dry.

Payne County: The Ingalls pool was extended a quarter northwest with completion of J. E. Crosbie, Inc.'s, Myatt B-2, SE SW NW 25-19n-4e, good for 100 barrels an hour from the Misener sand topped at 3842 feet. Oil string was cemented at 3833 feet and production is from 3842-60 feet.

Kansas

Four New Discoveries Reported During Week

Kansas continued to pace the Mid-Continent region with four new discoveries in the central and northwest sections of the state while a wildcat in Wallace County just across the line from Colorado was preparing to test the Shawnee and Wabaunsee zones.

Pratt County: Lion Oil Refining Company's Andrews 1, SEc 24-29s-14w, appeared as a pool opener 10 miles southwest of the Chitwood field. Drill-stem test in Simpson at 4440 feet recovered 1600 feet of oil in 15 minutes and operator is preparing to complete.

Stafford County: North of the Macksville field, Lynn et al's Cornwell 1, SE SE SE 3-24s-15w, has a pool opener in Arbuckle topped at 4103 feet. On drill-stem test at 4103 to 4121 feet, total depth, the well showed 2,000,000 feet of gas and a spray of black oil. Pipe is being set to bottom.

Sheridan County: Continental Oil Company's Cramer 1, NW NW NE 11-6s-27w, in the northeast of the county, 12 miles northwest of the Studley pool, flowed 128 barrels of oil in 12 hours on initial test from perforations at 3758-62 feet. Production is from Lansing and the discovery has stimulated a lease play in the area. Pipe was set at 3809 feet with the hole bottomed at 4047 feet.

Barton County: Ash et al's Schlochtermeyer 1, SW SW SE 5-19n-11w, 2½

Wells Completed in the United States in Week Ended April 15, 1941

Data preliminary and subject to revision. Revised and more complete data on all completions shown in monthly summary of drilling, published in second issue of each month. More detailed data on wildcats published in third issue of each month.

State or District	FIELD COMPLETIONS: New Wells *Oil	Gas	†Input	Dry	Total	Old Wells Deepened	WILDCAT COMPLETIONS *Oil	Gas	Dry	Total	ALL COMPLETIONS: This Week	Last Week	Cumulative: This Year	Last Year
Alabama	....	....	....	....	....	....	....	....	....	....	....	....	1	....
Arizona	....	....	....	....	....	....	....	....	....	....	....	1	3	....
Arkansas	2	....	....	....	2	1	....	1	1	2	5	2	52	69
California	22	....	....	1	23	1	....	....	6	6	30	38	548	360
Colorado	....	....	....	....	....	....	....	....	....	....	....	....	9	7
Georgia	....	....	....	....	....	....	....	....	....	....	....	....	....	1
Illinois	17	....	....	7	24	....	....	....	4	4	28	25	439	529
Indiana	2	....	....	....	2	....	....	....	....	....	2	7	83	78
Iowa	....	....	....	....	....	....	....	....	....	....	....	....	....	2
Kansas	12	2	....	8	22	....	....	....	....	....	22	28	520	436
Kentucky	3	....	....	2	5	....	....	....	2	2	7	7	166	79
Louisiana	10	....	....	5	15	....	2	....	2	4	19	6	183	147
North Louisiana	....	....	....	....	....	....	....	....	....	....	....	4	54	57
South Louisiana	10	....	....	5	15	....	2	....	2	4	19	2	129	90
Michigan	1	....	....	1	2	....	....	....	5	5	7	12	162	125
Mississippi	1	....	....	1	2	....	....	....	1	1	3	....	30	22
Missouri	....	....	....	....	....	....	....	....	....	....	....	....	3	3
Montana	3	....	....	....	3	....	....	....	....	....	3	4	71	50
Nebraska	....	....	....	....	....	....	....	....	....	....	....	....	7	17
New Mexico	3	....	....	....	3	....	....	....	1	1	4	6	120	72
New York	15	....	10	....	25	....	....	....	....	....	25	25	370	325
Ohio	1	1	....	1	3	....	....	....	2	2	5	5	208	255
Oklahoma	12	1	....	2	15	....	2	....	5	7	22	24	428	394
Pennsylvania	27	2	15	1	45	....	....	....	....	....	45	44	799	695
Tennessee	....	....	....	....	....	....	....	....	....	....	....	....	3	1
Texas	71	....	....	17	88	1	5	....	19	24	113	109	1,580	1,073
E.Tex.Bor. Co.'s	....	....	....	....	....	....	....	....	....	....	....	....	4	6
E. Texas Field	....	....	....	....	....	....	....	....	....	....	....	....	1	2
Rest of E. Texas	5	....	....	....	5	....	....	....	1	1	6	6	86	61
North Texas	14	....	....	9	23	....	1	....	4	5	28	24	368	254
W. Central Tex.	5	....	....	3	8	1	1	....	2	3	12	6	112	89
West Texas	26	....	....	1	27	....	1	....	5	6	33	27	424	241
Tex. Panhandle	1	....	....	....	1	....	....	....	....	....	1	7	57	69
G. Coast, Upper	8	....	....	1	9	....	....	....	4	4	13	11	135	69
G. Coast, Lower	10	....	....	....	10	....	1	....	3	4	14	20	251	159
Southwest Texas	2	....	....	2	4	....	1	....	....	1	5	5	112	100
S. Central Texas	....	....	....	1	1	....	....	....	....	....	1	3	30	23
West Virginia	....	14	....	1	15	....	....	....	....	....	15	15	269	175
Wyoming	2	....	....	....	2	....	....	....	....	....	2	....	45	35
Total U.S.	204	20	25	47	296	3	9	1	48	58	357	358	6,099	4,950

* Includes distillate wells. † Includes salt water disposal wells.

miles west of Rick pool, opened a field in the Arbuckle as the well filled up with 1000 feet of oil in 4 hours after drilling plug at 3407 feet.

Wallace County: Sinclair Prairie Oil Company was moving in unit to perforate Brock & Glad 1, SE NW SE 19-13s-42w, in the Wabaunsee section at 3939-53 and 4095-4108 feet, and in the Shawnee at 4228-42 feet. No showings have been reported in the sections. Total depth is 6000 feet with pipe set at 4300 feet. A gas show was reported at 2000 feet.

Illinois Basin

Montgomery Wildcat To Test Trenton Lime

The Texas Company's Marine State Bank 1, NE NE SE 32-10n-3w, a wildcat in Montgomery County in which possibly commercial shows of oil were found in Devonian lime, has set casing at 2639 feet, for a test of broken oil shows encountered in Trenton lime. Trenton was found at 2641-2714 feet, and operators are now moving in standard tools to drill plug. The Devonian, which carried shows which may be tested later was topped at 1991 feet.

George Cassens, who recently completed a semi-wildcat for a small producer in the Pottsville sand at 611-617 feet, has staked location for Morburger 1, SW NW SE 6-6n-7w, in wildcat territory, Montgomery County.

Edwards County: Superior Oil Company is ready to drill plug and test McClosky lime at Lambert 1, S½ NW SE 31-1s-11e, an extension well a mile north of the Albion pool. On a 30-minute drill-stem test of pay breaks at 3103-08 and 3137-48 feet, the well showed 2400 feet of clean oil and 70 feet of salt water. Aux Vases sand at 3048-63 feet also carried pay which probably will be tested.

Bond County: The Texas Company is testing Devonian lime at Enloe 1, SE SE NW 6-4n-2w, a wildcat 5 miles south of Greenville. Pipe was set at 2346 feet but when plug was drilled the hole showed much water and less oil than was expected. A plugback and squeeze job was run. Pay was found at 2363-70 feet.

Madison County: Rockhill Oil Company's Pence 1, SE SW SW 10-4n-6w, in the Marine pool, has been completed for 241 barrels daily flowing natural from Devonian lime at 1742 feet.

Clay County: Northwest of Flora, Gulf Refining Company has Wortham 1, W½ SE NE 14-3n-6e, temporarily shutdown at 2994 feet pending decision to set pipe. Shows of oil were found in the Benoist sand and the McClosky lime, the latter the best bet at 2974-84 feet.

Effingham County: Gulf Refining Company is awaiting favorable weather to move in materials for Deters 1, NW SE 27-9n-6e, wildcat north of the city of Effingham.

White County: National Associated Petroleum Company may extend the Calvin pool slightly north with Biehl sand production at Bisch 1, 30-3s-14w. After favorable shows in the sand then drilled ahead below 1800 feet.

Indiana

A discovery well is near completion in Knox County. Muller's McDowell 1, E½ NW SE 36-2n-11w, 3 miles southeast of the St. Francisville pool and 6 miles east of the Allenville pool of Illinois, set pipe at 1855 feet, and acidized McClosky lime at 1857-67 feet with 2000 gallons for a yield of 22 barrels of oil and 30 barrels of water.

Kentucky

The Texas Company and Ashland Refining Company's Culver 1, 12-P-20, 2½ miles northeast of production in the Uniontown pool, is shutdown because of high water, marking more than a month of idleness. During a drill stem test, the well filled 1300 feet with oil in one hour from McClosky lime at 2521-31 feet.

West Texas

World's Deepest Held at 15,255 Feet for Repairs

Mid-Continent Petroleum Corporation's University 1-7, 2 miles south of nearest production in the Fullerton field, was considered eliminated as a Clear Fork zone producer through having tested 1000 feet of sulphur water at 7194-7224 feet, and was drilling lime at 7360 feet. However, oil saturation passed up in the San Andres may warrant the landing of pipe for a production test. Prices averaging close to $1000 cash per acre were paid for University leases near this outpost at the March sale. A mile west extension for the south portion of the field is in prospect through Anderson-Prichard Oil Corporation's McCrea 1, having recorded favorable structural position in topping the San Andres at 4410 feet and San Angelo at 5580 feet with elevation of 3311 feet. This outpost was drilling lime at 6750 feet with first saturation due within 100 feet. Magnolia Petroleum Company's Logsdon 2, which is seeking a mile northeast extension, was drilling lime 6250 feet with 3307-foot elevation.

Deep Prospects: Phillips Petroleum Company's Ada Price 1, Pecos County record-depth holder, was idle for repairs in Simpson at 15,255 feet. In Gaines County, Continental Oil Company's Jones 1-A entered Ellenburger at 11,845 feet and halted at 12,222 feet to set 5-inch liner below 7-inch casing seat at 11,177 feet. Production tests will be made through perforations. In Andrews County, Shell Oil Company's Cox 1 was installing heavier rotary at 9548 feet, while Sinclair Prairie Oil Company's Grisham-Hunter 1 was drilling lime at 10,886 feet. Humble Oil & Refining Company's Scarborough 1, Western Andrews County, was drilling cherty-lime at 9680 feet, and Carter 1, Deep Rock area, was drilling lime at 11,410 feet.

Wheeler - Ellenburger: Stanolind-Shell's Blue 2, ½-mile south of the Ellenburger discovery, established the water level at 10,705-10,710 feet in recovering sulphur water along with flow of oil and gas, and then set pipe 2 feet off bottom for completion through perforations. This prospective fourth producer penetrated 161 feet of Ellenburger, while the discovery took in 204 feet of the dolomite without showing water. The partnership is starting Wheeler 1-C, ¾-mile northwest outpost, although the nearest producer had only 38 feet of pay above the water table. In Ector County, Cities Service Oil Company strengthened its lease position around the Shell-Cities Service Oil Company's T. P. Land Trust 1, projected 11,000-foot test authorized last October for C SW SE T&P 7, Block 45, T-1-S, 4 miles northeast of Wheeler-Ellenburger discovery, by paying $100 per acre cash and $1000 per acre out of oil for 5/6 interest lease on 2160-acre tracts.

Keystone-Ellenburger: Sid Richardson and Perry Bass' Walton 10-E, south offset to the deep discovery, and 120 feet high on Ellenburger, topped at 9099 feet, resumed coring to establish the thickness of the oil zone after flowing at the rate of 43 barrels of 42.3-gravity oil hourly through tester at 9745-9800 feet. This well has logged 701 feet of broken gas-distillate (gas cap) and oil-saturated dolomite. Seven-inch was cemented at 9675 feet to exclude the gas cap, which was not tested. Sinclair Prairie Oil Company's Campbell 1, 3½ miles southeast of regular Permian production on the Keystone structure, was drilling Simpson lime at 10,780 feet.

Crane County: The Texas Company's Hobbs-Shell 1, wildcat that passed up substantial oil and gas flow from Devonian, was drilling cherty-lime at 5770 feet with top of Silurian tentatively called at 5685 feet. I. T. Dennis and Jas. Fitz-Gerald Jr.'s McPherson 1, 4½ miles west by north of above prospect, drilling lime and shale 5070 feet. Magnolia Petroleum Company's Butler 1, Ellenburger project, was drilling at 2300 feet, and Gulf Oil Corporation's Dolly Estes 2, near shallow pumper on west side of county was drilling lime at 6425 feet. Gulf Oil Corporation's Waddell et al 43-E, 4 miles from nearest Ordovician production in the Sand Hills field, exhausted water, then swabbed 3 barrels of 31.5-gravity oil hourly from Ellenburger perforations at 5800-35 feet. Acid treatment will follow. This deep discovery is scheduled to be produced from the 4500-foot Clear Fork, thus becoming the first dual completion for the field.

Crockett County: Revival of development of the Todd field, which yields high-gravity oil from the Crinoidal (Pennsylvanian), is offset to a good start through Amerada et al's Todd 3-A flowing 501 barrels of oil on 18½-hour test through chokes from perforations at 5728-5800 feet. More perforations will be made opposite saturation at 5825-5930 feet.

Pecos County: Shell Oil Company's Cordova-Union (Atlantic) 1, east offset to the Owego pool discovery that later ceased flowing account of water, was making drill-stem test at 4040 feet in Ellenburger, topped at 4005 feet, 9 feet low. Magnolia Petroleum Company's Lemar 1-A, south offset to the discovery, was drilling lime at 3870 feet. Gulf Oil Corporation and L. H. Wentz's O'Sullivan 1, ½-mile northeast of the Elenburger discovery for the Wentz area, flowed 6 barrels of sulphur water with trace of oil and gas hourly after drilling plugs from 7-inch at 4307 feet with hole bottomed in granite at 4634 feet. This outpost has been plugged back to 4445 feet to make a separate test of the Ellenburger section, topped at 4307 feet with elevation of 2485 feet. Top of Hickory sand (Cambrian) called at 4600 feet.

Reagan County: Amerada Petroleum Corporation's Hickman 2, HE&WT 4,

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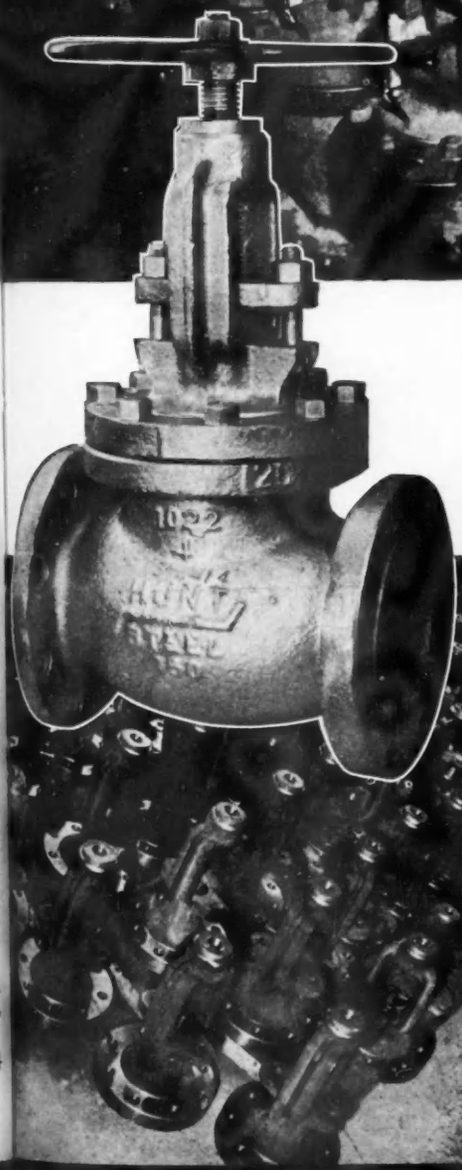

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northwest edge of the Barnhart field, established new potential record for the area in flowing at rate of 8143 barrels daily on ¾-inch choke, based upon 1½-hour gauge, after using 15,000 gallons of acid through Ellenburger perforations at 9008-9192 feet.

East Texas

Rusk County Well Shows For Best of the Week

Delta Drilling Company's Texas Pecan Nursery 1, Eastern Henderson County wildcat and 12½ miles northwest of the Larissa one-well deep pool, passed up indicated gas-distillate production in Rodessa saturation at 9685-9700 feet, and was drilling limey-shale at 10,010 feet. Production is anticipated from the Pettit near the 10,200-foot level.

Franklin County: Humble Oil & Refining Company's Hague 1, wildcat failure in Smackover section at 11,239-11,510 feet, was showing a small amount of black heavy oil with acid residue on preliminary swabbing test after 2-stage treatment with 1050 and 5040 gallons of acid through Rodessa perforations at 7125-40 feet. In the New Hope field, Tide Water-Seaboard Oil Company's Anderson 1, east outpost, opened a new oil zone in Travis Peak in flowing 99 barrels of 53-gravity oil, gas-oil ratio 1365/1, through drill-stem test of perforations at 8110-30 feet, having drilled out cement plug to 8135 feet. This originally flowed 10 barrels of 53-gravity oil hourly from bottom at 8205 feet with testing tool at 8150 feet. The hole was plugged back to 8177 feet, and drill-stem test at 8150-77 feet rated the flow at 410 barrels of 53-gravity oil, gas-oil ratio 1168/1, with 2 percent bs&w.

Wood County: Shell Oil Company et al's Herring-Scroggins 1, Paluxy failure for the southwest edge of the Manziel field, was drilling at 6790 feet in Glen Rose, topped at 6723 feet, and will try for production in the Rodessa and Pettit. Sun Oil Company's H. Johnston 1, southeast outpost, resumed coring after drill-stem test at 6298-6312 feet returned 40 feet of 26-gravity oil and 85 feet of rotary fluid and water. It may be carried to the Pettit also. Shell Oil Company's Whatley 1, which has been trying to complete a flowing well from Rodessa perforations at 8495-8525 feet, was circulating with 450 barrels of high-gravity crude from the nearby Quitman field with results undetermined. Amerada Petroleum Corporation's Sheppard 1, exploratory test between Manziel and Quitman areas, was coring broken Paluxy at 6439 feet, or 12 feet below the projected water level.

Hunt County: The abandonment of Humble Oil & Refining Company's Anderson 1, Juliet Porter Survey, in Paleozoics at 6204-73 feet concludes the search for production in the Smackover after the drilling of a cluster of 5 failures, including 4 for the company. Operators were exploring the possibilities of production from Smackover near the pinch-out on the Preston Bend Arch. Anderson 1 missed the Smackover. The single test by American Liberty Oil Company logged 41 feet of Smackover, then entered Eagle Mills.

Rusk County: Beacon Oil & Refiining Company and American Liberty Oil Company's Busby 1, 1500 feet northwest of their oil discovery for the Henderson pool, was showing for the areas' largest well, but had not been gauged after using 2000 gallons of acid through Pettit perforations at 7284-96 feet. Rig was skidded west to drill Katz & Brand 1.

Limestone County: Zephyr Oil Company's Nussbaum-Scharff 1, initial deep test for the old Groesbeck shallow gas field, flowed 145 barrels of oil and considerable water by heads during a 4-day period after acidizing Upper Glen Rose perforations at 4734-88 feet, having plugged back from Travis Peak at 5506 feet.

Smith County: Arkansas Fuel Oil Company's Marsh 1, 2400 feet southeast of the Sand Flat pool's flowing Paluxy discovery, pumped 243 barrels of 21.5-gravity oil initial from Paluxy perforations at 7080-7118 feet.

Camp County: Mid-Continent Petroleum Corporation's McGahee 1, 3 miles northwest of Pittsburg, logged Massive anhydrite at 7183-7370 feet with elevation of 429 feet, and was drilling dry shale-lime at 7550 feet.

Failures: Cosden Petroleum Corporation's Adams 1, projected deep test for Lamar County, quit in ingenous rock at 3036-63 feet. Hunt Oil Company's Marable 1, Hopkins County, logged water in Paluxy at 5890-6123 feet, and in Upshur County the firm's Tucker 1 was drilling water sand at 5817 feet in Paluxy section, topped at 5775 feet.

North Texas

Ellenburger Not Productive In Multi-Pay Woodbine Pool

Ellenburger was eliminated as a prospective producing horizon for the multi-pay Woodbine pool, eastern Cooke County, when Northern Ordnance, Inc.'s, Lindsay 1, northeast offset to the company's 4300-foot Strawn discovery, drilled dry dolomite at 4821-75 feet. Seven-inch was cemented at 4615 feet to complete through perforations, with four oil zones in the Strawn to select from. The company is operating five additional rigs in the area. The Woodbine pool promises to rival Walnut Bend in number of producing zones in the Strawn.

Magnolia Petroleum Company's Long 1, north offset to the 5100-foot Strawn discovery for the North Walnut Bend area, failed to indicate production in drilling to 5299 feet, and will continue to Ordovician. Sinclair Prairie Oil Company's Cory 1, northwest offset to its discovery, showed possible production in a deeper zone when tester was used at 5528-5708 feet, and was drilling dry dolomite at 6041 feet.

Discovery Wells: Kerlyn Oil Company and Phillips Petroleum Company's Cope 1, recent Bend strike in north Young County, flowed 615 barrels potential through ⅜-inch choke from perforations at 4385-4428 feet. In the Davidson pool, Wichita County, Fain-McGaha's Krisan 1, northeast offset to the Ellenburger discovery, established a new oil zone in flowing 112 barrels of oil on 8-hour gauge through 20/64-inch choke after 120-quart nitro shot in Strawn at 4815-51 feet, having failed to make a well in the Ellenburger. Wilcox Oil & Gas Company et al's Scaling 1, Clay County strike in Basal Bend, flowed 965 barrels potential through ½-inch from perforations at 5554-70 feet.

Young County: L. T. Burns et al's Christian 1, a mile southwest of the Burns-Ragland five-well deep area, was drilling plugs from 7-inch at 4809 feet to complete in Mississippian saturation at 4787-4975 feet, after drill-stem test yielded 750 feet of oil- and gas-cut mud. The pay zone of this well checks about level with the nearest field well. Northern Ordnance's Robertson 1, wildcat in southwestern Young County, tested a hole full of water from Ellenburger at 4660-76 feet, and will be plugged back to a gas zone passed up in Marble Falls at 3974-4178 feet. The company's McBrayer 1, wildcat 2 miles northeast of Jean, will try for completion by perforating Bend saturation at 4332-70 feet after proving dry in Ellenburger at 5385-5413 feet.

Southwest Texas

Several Wells in Testing Stage; Wildcats Spotted

Most wells that showed production last week were still in the testing stage. Further exploration continued with several wildcat locations being spotted.

In Victoria County, Northern Ordnance's Heath 1, 1 mile north of Mission Valley, was prevented by mechanical difficulties from testing. The well, several times squeezed and reperforated had been flowing 140 barrels of condensate daily. Total depth is 10,014 feet.

Bee County: Mills Bennett's Gingerich 1, NE NE Section 8, Ragley subdivision, J. M. Uranga Grant, was flowing gas and condensate from perforations at 7460-7500 feet, with some mud and salt water. The well is shut in with 2500 pounds pressure equalized on casing and tubing. Testing will proceed.

Luling Oil & Gas Company's Slick 8, Hodge survey in the South Caesar area, came in with production of 92 barrels per 24 hours on ⅛-inch choke, tubing pressure 590 pounds, casing pressure 130 pounds, gas-oil ratio 110/1.

Dewitt County: Arkansas Fuel Oil Company's Buehrig 1, 3 miles northwest of Myersville, squeezed and reperforated with 69 shots at 7827-35 feet, making 100 barrels of 55-gravity distillate on a 24-hour test. Further tests will be run next week.

Butcher-Arthur, Inc., was reported preparing to run a drill-stem test on Kolodziejoczyk 1. Good odor and color oil were recovered from 7443-49 feet. This wildcat is 6 miles southeast of Yorktown, in the Santos Grant.

Duval County: J. W. Gorham's Hoffman A-1, 12 miles south of Freer in survey 116, was abandoned at 3375 feet.

Jim Hogg County: The Texas Company's East 1, NWc Section 6, Rafael de la Pena Grant, in the Neuhaus field, was swabbing 40 barrels of 45-gravity oil from open hole at 3455-62 feet. Total depth is 3462 feet with 5½-inch casing set to 3455 feet.

Goliad County: Continental Oil Company's Heard 1, 4 miles south southwest of Weser field, swabbed and flowed 43 barrels in 13 hours on ⅛-inch choke, casing sealed, tubing pressure 750 pounds, and is now installing separator.

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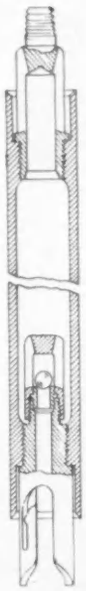

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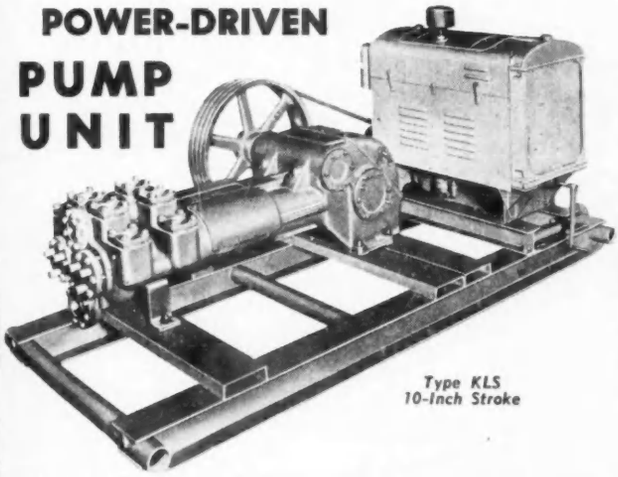

Type KLS
10-Inch Stroke

WORTHINGTON Pumps and *genuine* Worthington Repair Parts are available — through Lockett Dealers — from Warehouses maintained in the principal oil fields throughout Texas and Louisiana, backed up by a large replenishing stock at our Houston and New Orleans Warehouses. This enables Lockett Dealers to promptly supply needed equipment. Worthington Pumps are adaptable for use with Engines or Motors of any specified type or manufacture, to provide a complete pumping unit.

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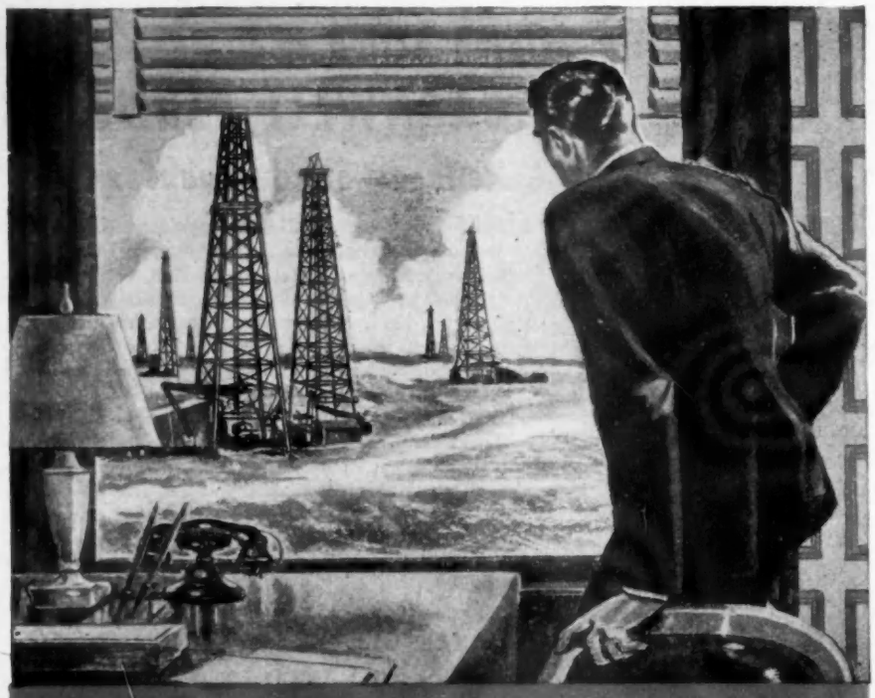

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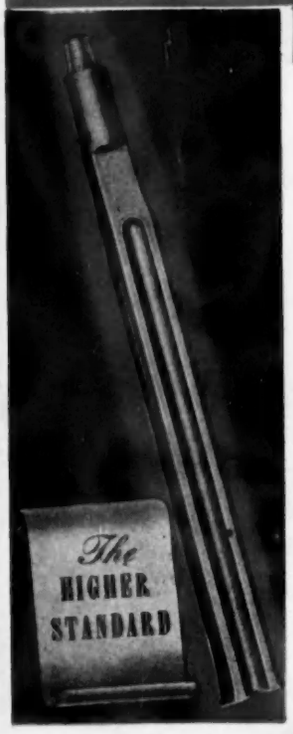

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War does teach conservation. It also gives experience—valuable experience. Out of it will come better products. Then there will be plenty of SPANG CABLE TOOLS for all peace time needs.

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Texas Gulf Coast

Possible New Pools Are Indicated by Wildcats

Interest has centered on several new tests indicative of possible new pools and good production. American Republics Corporation-Houston Oil Company of Texas' Sternenberg 1, wildcat in H&TC 195, Hardin County, which had reperforated for a second test at 6230-32 feet, was flowing into tanks at the rate of 144 barrels of oil and 155 barrels of water per day through a ¼-inch choke. Original perforations at 6231-33 feet which had produced about 8 barrels an hour on 3/16-inch choke were squeezed when water broke in.

Jefferson County: Sun Oil Company's Wingate 1, David Burnell survey, 3½ miles southeast of Fannett, was still testing. Latest gauge indicates a potential of 69 barrels of 31.9-gravity oil per day through ¼-inch choke, about 3 percent wash water and mud, 450 pound tubing pressure, casing sealed, gas-oil ratio 1825/1. Total depth is 8824 feet.

Matagorda County: Sun Oil Company's Braman 10, Thomas Cayco League, North Markham field, was flowing 11 barrels per hour of 36-gravity oil from perforations at 6962-67 feet, through a 12/64-inch choke. Total depth is 8100 feet with 5½-inch casing set to bottom.

Wharton County: Michaux et al's Pierce Estate 64-A, Chas. Howard League, is the first new producer for the North Withers field in several months. Pay was topped at 5292 feet, and pipe was perforated at 5308-18 feet with 52 shots. It is flowing 142.16-barrels of 26-gravity oil a day through 10/64-inch choke, tubing pressure 475 pounds, casing pressure 700 pounds, gas-oil ratio 302/1, total depth 5340 feet.

Polk County: Humble Oil & Refining Company is drilling below 6200 feet in Granbury 31, Livingston field, Section 11, A. Viesca survey, in shale and sand streaks. The well is going to just above 7000 feet where excellent Wilcox production was opened recently in Granbury 7. The company has staked locations for two more Wilcox tests in the area, C. P. Granbury et al 32, 1284 feet southwest of the Granbury 7; and C. B. Granbury 33, 1320 feet northeast of the Granbury 7.

Chambers County: Sun Oil Company is preparing to test casing before perforating in Daugherty "Pool" 1, on blocks 15-16, F. Valmore League A-25, 3½ miles north of Winnie. A test some weeks ago at 8752-55 feet flowed 112 barrels oil, 66 barrels salt water a day on a 10/64-inch choke, and the well has been shut in pending installation of a workover rig. Perforations were squeezed, with top of plug at 8926 feet.

South Louisiana

Rosedale Field Reports Its Second Producer

A second producer in the Rosedale field, Iberville Parish, came in last week when Sugarfield Oil Company completed Slack Bros. 1, 107-7s-10e. Hole was drilled to 10,296 feet, after cutting a major fault, and perforated at 10-134-38 for the completion. The well flowed a

Cummins Diesels Break Another World's Record

When the going got tough at 13,059 feet on Phillips No. 1 Price, Pecos County, 3 Cummins Diesels of 225 HP (compounded) were moved on to do the job. These engines, 6 and 7 years old, had already drilled 108,168 total hours . . . are now drilling below 15,160 feet *and going strong*. Another 225 HP Cummins Dependable Diesel powers the stand-by pump. Regan Blocks, also exclusive with Mid-Continent, and a Wilson Titan Rig, distributed by Mid-Continent, were selected to stand the gaff in drilling this world's deepest well.

We Congratulate Phillips Petroleum Co.

We have available for delivery Wilson Rigs powered with Cummins Dependable Diesels and all other equipment for complete drilling rigs identical or equal to that used on this well. No long delays in getting this material when you come to Mid-Continent Supply Co.

Now Is the Time! Be Wise—Modernize—Dieselize—Standardize With Cummins.

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General Offices — Mid-Continent Building — Fort Worth, Texas

potential of 172 barrels of 47.9-gravity oil a day through a ⅛-inch choke, with tubing pressure of 1550 pounds and casing pressure of 1000 pounds. The discovery well of this field was completed in October, 1943.

Beauregard Parish: Union Oil Company is scheduling a new test in its recently opened Gordon field and is preparing location for Edgewood 2. The discovery producer, Edgewood 1, Section 25-6s-10w, was completed in perforations at 6767-70 feet, and is flowing 31.74 barrels of condensate with considerable gas daily on 8/64-inch choke, at 6900 feet.

Jeff Davis Parish: Continental Oil Company and Union Sulphur Company are still testing H. J. Shoesmith 1, Section 1-8s-4w, China area, in perforations at 9188-99 feet. The last gauge reported was 40 barrels of condensate through choke in 23 hours, with a gas-oil ratio of 47,602/1.

St. Landry Parish: The Texas Company's Swift 1, wildcat in 14-5s-7e, 2½ miles northeast of Krotz Springs, was drilling in shale and sand at 10-700 feet, after setting a string of 7-inch protection casing at 10-575 feet.

St. Martin Parish: Amerada Petroleum Corporation's Emilie Kidder 1, north of the discovery well at Arnaudville, was reported to have completed tests last week. The well was making 37 barrels of light distillate per day with a gas-oil ratio of 18,351/1, on a 5/32-inch choke, tubing pressure 3450 pounds, and has been shut in. Location for a second well has been started 3050 east of Kidder 1, in Section 44-7s-5e.

Arkansas

Columbia County Wells May Connect Fields

Indications that the West Atlanta field may be connected with the original Atlanta field in Columbia County, Arkansas, were seen in reports from Tide Water Associated Oil Company's O'Bier 1, C SE NE 18-18s-19w, where production is expected in both the Cotton Valley and lime formations. Hole was drilled to 7940 feet. O'Bier 1 is a north offset to the field's discovery. West Atlanta was brought in on July 4, 1943, and subsequent developments indicated that production ran from east to west. Showings in the O'Bier well indicate a north and south trend.

Union County: In what amounts to opening of a new small pool, J. C. Manley's J. C. Woods 1, 25-18-15, in the Hilbank area, is now producing on pump at the rate of 10 barrels daily. Indications are that at least three additional wildcats will be started soon.

Alabama

Hunt Company Working On Two More Wells

Hunt Oil Company, which opened the first Alabama oil field with Jackson 1, SW NE 2-10n-4w, Choctaw County, and Jackson 2, SE NE 2-10n-4w, is attempting to complete the third and fourth wells in that field. The first two wells came in from the Selma chalk at 2800 feet.

Casing has been set in Doggett 1, a quarter-mile north offset of the discovery, and a drill-stem test was made in Doggett 2, quarter-mile west offset of the discovery.

Mississippi

Gulf Gets Another Heidleberg Producer

Gulf Refining Company has completed a second good producer near the Heidleberg field, Jasper County, and Mississippi Oil and Gas Board will meet April 20 at Jackson to draw up regulations for the field. The discovery well, Helen Morrison 1, C NE SE 30-1n-13w, produced at the rate of 1000 barrels of oil a day through 11/64-inch choke from 100 feet of oil sand around the 4500-4900-foot level. The second well, Louis Morrison 1, NW NE SE 30-1n-13w, tested 1000 barrels of oil on a 22/64-inch choke, from perforations at 4518-4648 feet. Total depth is 5500 feet. Heidleberg field is now the third largest in the state, the two larger fields being Tinsley in Yazoo County and Cranfield in Adams County. Gulf Refining Company has started a third location, T. D. Lewis 1, C SE NE 30-1-13, and Kingswood Oil Company has a location, Eddy Risher 1, C SW SE 13-1-13. Sun Oil Company's Mack Lindsley 1, offset to the discovery well is drilling ahead after two gas blowouts.

Wayne County: Gulf Refining Company has a new location in Eucutta field, Chas. Green 1, C SE NE 2-9-9. Vaughey and Vaughey have made location for a deep wildcat, C NW SW 24-1n-2e, 7 miles south and west of the Vaughn-Pickens field and 20 miles east of the Tinsley field.

Florida

Second Florida Well Reported Drilling Flat

Humble Oil & Refining Company's Gulf Coast Realities 2, in Collier County, Florida, was drilling at 10,300 feet on April 11, in Lower Cretaceous lime, the same formation in which the discovery was completed in January. The second well will be carried on to the approximate depth of 11,621 feet at which the first well was completed. The only oil show encountered in the second operation was at 9800 feet, where a drill-stem test failed to recover fluid, presumably because of lack of porosity. Elevations in No. 2 are running the same as in the first well, indicating no intervening changes in dip.

Rocky Mountain Area

New Oil Field Reported In Wagonhound Structure

Swabbing 497 barrels of oil over a 24-hour period, Broderick & Gordon's E. J. Christenson 1, CNL NE SE 6-44n-98w, wildcat of the Wagonhound structure, Hot Springs County, located in the Big Horn Basin and 4 miles northwest of Hamilton Dome field, is added to the list of Wyoming oil fields, is

Man Bites Dog

The other morning we drove hurriedly into a service station for our spare tire. The brawny attendant opened sleepy eyes and stretched luxuriously. The porter was out — we would have to wait. We looked at the poor sap and wondered if his forebears, with their hands and minds, carved a place for themselves in America. The war has nothing to do with such derelictions. Nor labor shortage. Call it disintegration of moral fiber; a people grown apathetic, accepting social security, bureaucracy, supression of news and free speech, labor domination, even the idea of a 4th term. No wonder men TRY PELCO FIRST for supplies and equipment — for service, courtesy and appreciation now as rare as man bites dog.

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producing from Embar, perforated between 4302-4278 feet. Hole was drilled to 4700 feet, encountered water in the Tensleep sand at 4508 feet, plugged back to 4360 feet and 7-inch casing cemented at 4361 feet. While the Tensleep was water-bearing, cores showed oil saturation and it is believed the Tensleep will prove productive higher on the structure. Top of the Embar was logged at 4258 feet and oil-saturated cores were recovered at 4273, 4282, 4286, 4290, 4295, 4300, 4305, and 4310 feet. The Wagonhound structure is described as an unfaulted anticline with 400 feet of closure. It plunges to the northwest and surface formation is Cody shale. The discovery is an offset of Midwest Refining Company's test drilled in 1930 in C NW SE 6-44n-98w, which encountered hot sulphur water in the Embar at 4330 feet and after encountering mechanical difficulties was abandoned at 4520 feet.

Cooper Cove: Stanolind Oil & Gas Company's Johnson-Parkinson 1, SE NE SW 20-18n-77w, Cooper Cove wildcat in Carbon County, yielded 3500 feet of oil, 120 feet of mud-cut oil on drill-stem test open 75 minutes in Dakota sand at 4868-93 feet, top at 4834 feet, and is now drilling at 4965 feet to test the Sundance. Cooper Cove is 35 miles north of Laramie.

Michigan

Exploratory Work Kept At Relatively High Level

Nine new drilling permits included 5 wildcat locations to keep exploratory work at a relatively high level (60 out of 136 first reports this year were wildcats) but interest as a whole is low. Pure Oil Company is standardizing Peterson 1, E½ SE NW 16-11n-11w, Newaygo County, at 901 feet after testing Stray sand for gas. It was non-productive. This is probably the top current wildcat prospect having been located after extensive core drilling.

STEWART P. KENT has been appointed assistant district superintendent for The Texas Company in Illinois, succeeding A. J. Holland. Arch W. Baucum, formerly assistant division engineer in South Texas will replace Kent in Tulsa as district engineer.

ADVERTISING RATES

TRADING POST SECTION

Regular classified advertisements for this special section, set in type this size without border, take flat rate of 7 cents per word for the first insertion and 5 cents per word for each subsequent insertion of same copy. Display advertisements for this section, set in suitably larger type with ruled border, are $5.00 per inch for first insertion and $4.00 per inch for subsequent insertions. Remittance must accompany copy which should be sent to:

Trading Post Section, THE OIL WEEKLY
P. O. Box 2608 Houston 1, Texas

California

East Coyote Wildcat May Mean New Dome

First results from production tests of Barnsdall Oil Company's East Coyote, Los Angeles Basin, wildcat indicate the discovery of a new pool for that area. Water troubles, presumably due to the hole having been taken a little too deep, leave room for some uncertainty as to the final outcome of this first test, but swabbing produced as much as five barrels an hour of oil, and equipment is being installed to put the well on pump. If the belief is confirmed that this test has uncovered another of the domes typical of the Coyote productive areas, the opening of new production of importance would be indicated.

Other wildcats being closely watched are now at critical stages, with interest in some of them keener because formation data is being withheld. One of these is Standard Oil Company's Fillmore area, Ventura County, wildcat now at the greatest depth ever drilled in a Los Angeles Basin well, below 13,500 feet. Two others on the "no dope" list are Superior Oil Company's Strand area, Kern County, try for a new pool, and Richfield Oil Corporation's Sylmar area, Los Angeles County, wildcat. Unofficial reports have credited all of these with showings, with especially promising results reported from tests of the Strand area project.

Kern County: Outcome of Standard Oil Company's second test of the new Buena Vista horizon discovered last month is anticipated because confirmatory results would be taken as a go signal for the start of a dozen or more nearby wells. The step-out, about a half mile to the north of the discovery well, is drilling with expectations of reaching the sand within three weeks. A unit plan adopted for the new horizon permits 10-acre spacing.

The Ant Hill area, unsuccessfully tested by Amerada Petroleum Corporation earlier this year is to be given a second try by the same company, a new wildcat having been started in SW 9-29-29.

Further adding to a growing list of Midway district tries for new pays, E. R. Bardwell has staked location for a test in 23-11-24, Maricopa area, and Chanslor Canfield Midway Oil Company has started another in 2-32-23, Midway area proper. The latter company's other Midway wildcat, in 20-32-23, failed to find objective sands and was abandoned at 3513 feet.

Santa Barbara County: Within the townsite of Naples, Standard Oil Company has leased property along the ocean front, preliminary to wildcatting tidelands offshore from the town. The area is only a few miles west of Elwood field.

R. R. OSBURN, general superintendent for The Texas-New Mexico Pipe Line Company in the Permian Basin, has been commissioned a captain in the Texas National Guard and placed in charge of the Midland, Texas, body. He was a reserve officer in the Army for 15 years.

The OIL WEEKLY'S **TRADING POST**

USED EQUIPMENT FORUM

CLASSIFIED ADS . . . EQUIPMENT . . . SERVICES . . . PERSONNEL

FOR SALE

■ FOR SALE: 35 bbls oil production, six wells 2200 feet, and over 300 acres of undeveloped leases. Southern Oklahoma. Details on request. Address: Box 43, c/o The Oil Weekly, Houston, Texas.

■ Ideco draw works (Unitized), Ideal & Oil Well twin cylinder drilling engines, 18" Wilson-Snyder & 14" Ideal pumps, Drilling cables, Engine substructure, Moon generator, Brewster core reel & line, Brewster drill collar, core barrels, etc., 7" Hughes gate valve 3000 lbs., 7x3x8 Worthington pump, American overshot 8¼" OD, Wilson drill tongs & Elevators, Mission & WKM slips. Other equipment, First class, Priced right. Sorrento Petroleum Corp., American Bank Building, New Orleans, La.

■ **For Sale: 1 Clark 120 H. P. drilling engine with reversible clutch. Claud White, Breckenridge, Texas or J. L. Higginbotham, 2514 Commerce St., Dallas, Texas.**

FOR SALE
55,000 Barrel Oil Storage Tanks.
30—already down. Matchmarked, cleaned and ready to load.
Grade A steel. Mexia, Texas.
PICKENS AND BENDER
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BUSINESS OPPORTUNITIES

■ **Capital Seekers—Interested in raising $25,000 or more for a legitimate project should write to Amster Leonard, Fox Theater Bldg., Detroit 1, Mich.**

WANTED TO BUY

■ Bottom-Hole Pressure Gauge dead weight tester, Crosby style (or similar) range graduated from 0 to 3000 lbs or 4000 lbs. Give location, condition and price. Post Office Box 2249, Wichita Falls, Texas.

HELP WANTED

■ WANTED: Experienced Petroleum Engineers for work in South America. Give full particulars regarding experience, age, marital status, draft status. Applicant must comply with War Manpower regulations. Address: Box 44, c/o The Oil Weekly, Houston, Texas.

■ **WANTED: A Petroleum Engineer with field experience, for engineering development work, with a large manufacturer of oil field equipment and materials. Permanent position with good future for right man. In replying state age, education, business background, salary desired, etc. Address: Box 38, c/o The Oil Weekly, Houston, Texas.**

■ Sperry-Sun Well Surveying Company has openings for:
Two District Representatives
One Directional Drilling Engineer
Applicants must have not less than three years' experience in well surveying or directional drilling and field work. Deferred draft status and certificate of availability for permanent employment are essential. Mail applications, in duplicate, care of
Sperry-Sun Well Surveying Company
3118 Blodgett Avenue
Houston 4, Texas

U. S. Exploratory Completions

ARKANSAS WILDCATS

Hempstead County—Failure: M. E. Davis' Harry Ezell et al 1, c of se se ne 2-13s-27w, abnd 4385 ft.

Union County—Gas Discovery: Curtis Kinard's P. W. Gaddy 1, c of sw sw sw 12-17-14, completed as gasser, no gauge, td 3303 ft.

CALIFORNIA WILDCATS

Fresno County—Failure: Amerada's Reedley Comm. 2-11, se ne nw 9-3-20, abnd 1000 ft.

Kern County—Failures: Bandini Pet. Corp.'s Signal-Mills 6, nw se sw 24-28-28, Vedder 2290 ft, gray sand, abnd 2324 ft.

Chanslor Canfield Midway Oil Co.'s G-2, ne ne ne 9-32-23, Midway area, br shale, abnd 3513 ft.

Los Angeles County—Failure: Tide Water's Downey 10-1, 4-3-12, Downey area, abnd in Lower Pico 7945 ft.

San Luis Obispo County—Failure: Los Nietos Co.'s Scott 2, 4-32-13, Arroyo Grande area, wet oil sand 3160-90 ft, abnd 3239 ft.

Ventura County—Failure: Wilshire Oil Co.'s Petit 1, se nw se 9-3-20, South Mountain area, bottomed wrong side of fault, abnd 1773 ft.

ILLINOIS WILDCATS

Franklin County — Failure: Nat'l Assoc. Pet.'s Old Ben Coal U-1, sw sw ne 16-5s-2e, abnd 3010 ft.

Hamilton County—Failure: Gulf's McGeath 1, ne ne se 17-4s-5e, abnd 3515 ft.

St. Clair County—Failure: Young's McCurdy 3, c nw nw nw 32-3s-6w, abnd 530 ft.

Shelby County—Failure: Texas Co.'s Noffke 1, se se nw 31-11n-6e, abnd 2182 ft.

KENTUCKY WILDCATS

Henderson County—Failures: Carter's Waller 1-A, 15-O-22, abnd 712 ft.

Nat'l Assoc. Pet.'s Williams 1-A, 1-O-24, abnd 2501 ft.

SOUTH LOUISIANA WILDCATS

Beauregard Parish — Gordon Discovery: Union Oil Cal.'s Edgewood L&L Co. 1, 537 fr w 2860 fr sl 2a-6s-10w, elev 95 ft, perf 6767-70 ft, flow 31 bbls 62-gr, ⅛-in, 2a,147/1, td 6900 ft.

Beauregard Parish—Oreta Prospect Failure: Lutcher-Moore Lbr. Co.'s 660 n&w of sec sw 22-6s-11w, jnkd and abnd 12,325 ft.

Jefferson Parish—Bayou de Fleur Failure: c ne se 65-16s-24e, 3350 e 1986 n of sw cor sec 65, abnd 10,985 ft.

SOUTH LOUISIANA NEW PAY TEST

Iberville Parish—Rosedale Discovery: Sugarfield Oil Co.'s Slack Bros. 1, start se cor sec 75 go 2669 n 16° w alg wl sec 107 th 649 ely at ra 107-7s-1oe, perf 16 shots 10,134-38 ft, flow 172 bbls 47.9-gr, ⅛-in, td 10,296 ft.

MICHIGAN WILDCATS

Allegan County—Failure: William Moser's Brenner 1, se ne nw 23-3n-13w, Traverse 1752 ft, abnd 1797 ft.

Antrim County—Failure: Sohio's Jordan 1, s½ ne nw 9-31n-7w, Richfield, abnd 2112 ft.

Genesee County—Failure: H. H. Heinig's Bardon 1, ne se ne 9-9n-8e, Traverse 1933 ft, abnd 2008 ft.

Gladwin County—Failure: Sun's Nash 1, ne nw sw 31-20n-2w, Dundee 3825 ft, Richfield 4994 ft, abnd 5070 ft.

Ottawa County — Failure: C. A. Perry's Bloemers 1, nw nw ne 11-6n-15w, Traverse 1758 ft, abnd 1796 ft.

MISSISSIPPI WILDCAT

Lawrence County—Failure: Gulf's S. N. Hickman 1, 1984 w 660 s of nec 8-6n-20w, Talla 2840 ft, Wilcox 3111 ft, abnd 9276 ft.

NEW MEXICO WILDCAT

Lea County—Failure: Magnolia's State 1-U, c sw sw 10-11s-35e, elev 4136 ft, anhydrite 2218 ft, San Andres 4220 ft, abnd 5505 ft.

OKLAHOMA WILDCATS

Garvin County—Failure: Sohio's Evans 1, ne ne ne 5-2n-1w, Bromide 5970 ft, abnd 6158 ft.

Garvin County—Failure: Pure's Brimley 1, nw ne nw 1-3n-1w, Pennsylvanian 4045 ft, abnd 4582 ft.

Jefferson County—Failure: Ohio's Ash 1, sw sw nw 17-5s-7w, Hoxbar 990 ft, Arbuckle 3247 ft, abnd 3581 ft.

Payne County—Discovery: Stanolind et al's School Land 15-1, ne se sw 16-19n-4e, Second Wilcox 4033 ft, perf 4032-41 ft, flow 107 bbls 45-gr, td 4041 ft.

Creek County—Discovery: Sneed's Eason 1, sw ne se 12-14n-10e, perf 2448-2514 ft, pump 90 bbls 30.4-gr, td 2565 ft.

Garvin County—Failure: Ohio's Dorchester 1-A-F, nw nw sw 2-3n-1w, Viola 4416 ft, abnd 4750 ft.

Kay County—Failure: Shaffer's Simmons 1, nw ne nw 11-27n-3e, abnd 946 ft.

Lincoln County — Failure: Creekmore-Rooney's Sturdivan 1, se nw nw 33-12n-5e, Prue 3885 ft, Hunton 4721 ft, Sylvan 4780 ft, Viola 4880 ft, 1st Wilcox 4960 ft, 2nd Wilcox 5010 ft, abnd 5117 ft.

Logan County—Discovery: Atlantic's Kerfoot 1, se se ne 31-18n-3w, Hunton 5902 ft, Dol 6135 ft, 1st Wilcox 6168 ft, 2nd Wilcox 6720 ft, perf 6168-6235 ft, pump 102 bbls 40-gr, td 6280 ft.

Pawnee County—Failure: Curtis Oil's Rice 1, nw nw sw 13-23n-5e, Chert 3090 ft, abnd 3139 ft.

Stephens County—Failure: Grimes et al's Federal Life Ins. 1, ne ne se 2-3s-7w, abnd 2388 ft.

NORTH TEXAS WILDCATS

Archer County—Failures: E. R. Perkins et al's Frerich 1, 935 ft nsl 300 ft wel sec 66, blk 3, Clark-Plumb sur, abnd 1311 ft.

Frank Wood et al's Campbell 1, 300 ft snl 800 ft wel blk 4, Crawford subdiv of I. Holman sur, abnd 1401 ft.

Throckmorton County—Failure: H. E. Burns et al's Tharp 1, 220 ft snl 1645 ft wel TE&L Co. sec 1632, abnd 793 ft.

Young County—Failure: L. T. Burns et al's Winkler 1, 1000 ft snl 1200 ft wel TE&L sec 405, abnd 1297 ft.

NORTH TEXAS NEW PAY TEST

Archer County — Cooper-Parkey Discovery: Geo. R. Cooper et al's Parkey-Fain 1, se nw nw S.P. Ry. 2, A-1233, elev 1053 ft, Upper Strawn pay 3797 ft, KMA lime 4319 ft, flow 132 bbls 44-gr, 12/64-in, shot 130 qts nitro 3902-39 ft, td 4347 ft, pb 3939 ft.

WEST CENTRAL TEXAS WILDCATS

Coleman County—Oil Discovery: Chas. P. Franchot, tr, W. E. Ball and E. L. Hanson's Michie 1, 1980 ft snl 660 ft wel, J. L. Luckenback sur No 258, A-480, elev 1688 ft, Bend 2654 ft, Ranger 3312 ft, flow 14 bbls 42-gr, 2-in, 3311-25 ft.

Jones County—Failure: W. D. Brookover et al's Kelso 1, 1403 ft nsl 400 ft ewl sec 101, Lge 126, Godwin subdiv, abnd 2845 ft.

Taylor County—Failure: Humble's Nolte 1, 660 ft out swc 167-ac tr, Lge 121, Guadalupe CSL sur, elev 1932 ft, Noodle Creek 2225 ft, abnd 3530 ft.

WEST TEXAS WILDCATS

Dickens County—Failure: Seaboard Oil Co.'s Pitchfork 1, c ne nw sec 93, Indianola Railway sur, elev 2445 ft, Clear Fork 1810 ft, Wichita-Albany 2720 ft, abnd 5161 ft.

Gaines County — Failure: Northern Ordnance's Birge 1, c se se PSL 1, blk C-43, elev 3146 ft, anhydrite 2422 ft, abnd 3820 ft.

Hockley County—Oil Discovery: Stanolind's Cobb 1, 660 ft out se cor lab 103-E, Lge 75, Haskell CSL sur, 14½ mi n Slaughter field, elev 3570 ft, anhydrite 1960 ft, brown lime 3310 ft, San Andres 3610 ft, swab 58 bbls 31-gr oil, 19 bbls wtr, 7300 gals acid San Andres 4596-4685 ft, pb 4663 ft.

Menard County—Failure: C. H. Murdick et al's Allison 1, 1320 ft out se cor sec 248, A. Melkoter sur A-539, elev 2132 ft, lime 3198 ft, Ellenburger 3555 ft, abnd 3815 ft.

Pecos County—Failure: Phillips' Iowa Realty 1, c n¼ of n¼ H&GN 139, blk 10, elev 2430 ft, Ellenburger 4095 ft, abnd 4178 ft.

Reeves County—Failure: Standard of Texas' Randolph 1, c sw ne T&P 46, blk 57, elev 2968 ft, Delaware lime 2829 ft, sand 2853 ft, abnd 3150 ft.

LOWER TEXAS COAST WILDCATS

Bee County—Failure: W. Earl Rowe & Rodney Delange's J. A. Janka Est. 1, 330 fr se& swl 187-ac tr Bee Co. SL sur 16, W. C. McBride farmout, abnd 4530 ft.

Karnes County—Failure: CE-Beth Oil Co.'s Annie Nischer 1, 1980 fr sl 660 fr wl 282-ac lse, John F. Miller sur A-192, elev 326, Pettus 710 ft, Cook Mt. 1326, Mt. Selman 2035 ft, Carrizo 3303 ft, abnd 6602 ft.

LOWER TEXAS COAST NEW PAY TEST

Nueces County—Riverside New Oil Discovery: Stanolind's Jennie Thompson 3, 543 fr nl 399 fr el blk 42, Joaquin Lopez de Herrera sur, 2975-ac lse, extends Riverside field 4212 ft e-ne, pay 6297 ft, perf 6297-6300 ft, flow 154 bbls 38-gr, ⅛-in, 1075 tp, td 7230 ft, pb 6344 ft.

LOWER TEXAS COAST OUTPOST

Bee County—Blanconia Failure: Pure's B. F. Barber 1, 919 fr nely nel 2449 fr swl 308-ac lse, John Kelly sur A-36, elev 85 ft, abnd 5600 ft.

TEXAS GULF COAST WILDCATS

Brazoria County—Failures: Kirby Pet. Co.-Continental's Ramsey State Prison Farm 1, 330 out of nec 40- ac tr 1200 fr sl S. F. Austin sur 9, abnd 8516 ft.

Skelley's Shepard Unit 1, 621 fr e 772 fr sl 44-ac lse, sec 92. E. Little sur A-320, abnd 8362 ft.

Ft. Bend County—Failure: H. M. Naylor's G. W. Butler 1, 660 fr se&swl 362-ac lse sw 40-ac unit, Wm. Lusk sur, abnd 9766 ft.

Jefferson County—Failure: G. H. McCarthy's E. F. Lohmann et al 1, 2015 fr n 2030 fr el 840-ac lse T&NO sur A-216 sec 71, abnd 9697 ft.

EAST TEXAS WILDCAT

Hunt County—Failure: Humble's Anderson 1, 4150 ft nsl 4540 ft ewl, Juliet Porter sur and nw part 101-ac lse, elev 599 ft, Woodbine 1828 ft, Georgetown 2525 ft, Paluxy 3196 ft, 1st Glen Rose 3437 ft, massive anhydrite 3983-4047 ft, Cotton Valley 5506 ft, Buckner 5990 ft, no Smackover, Paleozoics (red slate) 6204 ft, abnd 6273 ft in sandy-shale.

United States Wildcat Starts

ARKANSAS

Union County: Carter Oil Co.'s G. F. Wilson C-106, sw sw nw 33-16-18, west of Mt. Holly, permit obtained.

Hempstead County: Royal Oil and Gas Corp.-Lotus McWilliams Della's E. Sanford 1, se ne nw 23-13-24, permit obtained.

CALIFORNIA

Fresno County: Amerada's Reedley Comm. 6-1, ne sw sw 36-15-23, Reedley area, spd.

Kern County: E. R. Bardwell's 1, se ne ne 2-32-23, Maricopa area, lcn.

Chanslor Canfield Midway Oil Co.'s G-3, se ne ne 2-32-23, Midway area, lcn.

J. & S. Exploration Co.'s Crookshank 2, se se nw 19-30-27, Mojave area, rig.

H. H. Magee's Amalgamated-Hoppold 1, c sw 15-24-24, Trico area gas test, rig.

Standard's 2-10, ne sw sw 17-29-29, North Edison area, lcn.

San Joaquin County: Standard's Gerheart Comm. 1, se ne sw 24-2-5, Tracy area, lcn.

ILLINOIS

Clinton County: Bayer et al's Deirmeath 1, ne ne nw 8-1n-2w, lcn.

Monroe County: Morris' Crowder 1, nw nw ne 16-2s-10w, lcn.

INDIANA

Daviess County: Slaubaugh Bros.' Knepp 1, se se ne 22-3n-6w, lcn.

Vanderburg County: Henley et al's Gunder 1, nw nw se 6-6s-10w, lcn.

KENTUCKY

Ohio County: Sohio's French 1, 4-M-31, lcn.

SOUTH LOUISIANA

Cameron Parish: Continental's Nona M. Hennington 1, 2310 n&e of sw cor 21-12s-8w, lcn 9600-ft test.

St. James Parish: Humble's Rosa Roussell Keller et al 1, start nw cor sec. 30 go sly on wl 6109 th ely at ra 660 to lcn, 31-12s-4e, 11,000-ft test.

MICHIGAN

Clare County: Sun's Cornwell 1, nw nw ne 25-18n-4w, lcn.

Union Drilling & Prod. Co.'s Williamson 1, sw sw sw 14-17n-5w, dr.

Huron County: C. W. Teater's Moran 1, e½ se nw 8-17n-14e, rig.

Mecosta County: H. L. Wadsworth's Sarns 1, se nw se 7-13n-10w, dk.

St. Clair County: W. A. Roth's Monticciolo 1, e½ w½ ne 32-7n-17e, lcn.

MISSISSIPPI

Jeff Davis County: E. W. Richardson's C. K. Berry 1, 24-9n-19w, lcn.

NEW MEXICO

Eddy County: Humble's W. H. Braunlin-Carpenter 1, c sw ne 20-16s-30e, 2 mi nw of w edge Square Lake field, lcn.

OKLAHOMA

Beckham County: Northern Ordnance's Crawford 1, ne se 25-9n-22w, rur.

Garvin County: Helmerich & Payne's Freeman 1, c se 14-1n-1w, mir.

Wolf's Box 1, se ne ne 34-1-n-1w, dr 600 ft.

Hughes County: Bartlett et al's Lowe 1, se se ne 18-8n-9e, c&p.

Jackson County: Helas Pet.'s Carlisle 1, sw nw sw 7-1s-19w, mir.

Washita County: California Co.'s Reeder 1, ne nw 1-8n-17w, cellar.

Carter County: Razen Bros.' Robinson 1, nw sw sw 4-1s-2w, lcn.

Hughes County: Mealy-Wolf's Baker 1, sw se ne 35-9n-10e, spud.

Power Oil's Garrett 1, ne nw 14-9n-10e, dr 2660 ft.

Kiowa County: McIntyre's 1 Hydman, nw nw nw 10-6n-16w, lcn.

Pawnee County: Westgate et al's Cooper 1, ne ne se 19-20n-5e, rig.

Pottawatomie County: Coronado's Tyner 1, nw ne sw 30-9n-2e, lcn.

WEST TEXAS

Cochran County: L. A. Douglas et al's R. E. Sherrill 1, c nw se PSL 10, blk W, lcn 5500-ft test.

San Andres Prod. Co. et al's M. B. Clouser 1, c nw lab 18, Lge 62, Midland CSL sur, lcn 6000-ft test.

Culbertson County: Standard of Texas' T. P. Land Trust Co. 1-39, c ne nw T&P Ry. 13, blk 59, Tsp 2, lcn cable tool 2400-ft Delaware test.

Gaines County: Case, Pomeroy & Co.'s Fee 1, c sw ne PSL 13, blk C-44, 4⅝ mi se Seminole prod, lcn 5500-ft test.

Pecos County: Humble's State Nat'l Bank (El Paso) 1, c ne ne T&St.L. Ry. 7, blk 140, lcn 6500-ft Ellenburger test.

WEST CENTRAL TEXAS

Jones County: Humble's S. S. Schornick 1, c nw sw sec 7, Blind Asylum Lands, mim 4000-ft cable test.

H. L. Hunt Oil Co.'s T. J. Amason 1, 660 ft out swc, Samuel Jones sur No 266, lcn.

Taylor County: Brown-Hancock-Hines Oil Corp.'s R. H. Middleton 1, 660 ft out nwc east 83⅓-ac tr, W. F. Sparks sur A-509, lcn 3100-ft test.

TEXAS GULF COAST

Colorado County: Sinclair Prairie's C. G. Glassock 2, 4500 e of wl 2500 s of nl of Collier sur A-148, lcn.

Fayette County: Palmer Oil Corp's E. A. Arnim Est. 1, 1320 fr e 330 fr sl 447-ac lse, Wm. Kuykendall 1/3 Lge, lcn 6000-ft test.

H. M. Naylor O. Co.'s R. F. Ransom 1, 533 fr s 817 fr wl 40-ac unit out of 858-ac tr, Jos. Kuykendall sur, lcn 10,000-ft test.

Harris County: Danciger O&R Co.'s Nadaline Sellers 1, 330 fr s&wl 49-ac tr ne sec 2, HT&B sur, lcn 6800-ft test.

EAST TEXAS

Henderson County: E. B. Germany & Sons' H. E. Bonsell 1, 467 ft out ne cor 70-ac tr, or 4000 ft wel 2850 ft snl, Vincente Michelli sur, 2½ mi sw Eustace, mim for Paluxy test.

Hunt County: H. L. Hunt Oil Co.'s C. H. Denton 1, 660 ft out nw cor of 533.76-ac tr, John Blocker sur, lcn.

Titus County: Humble's Anna B. Stevens 1, 660 ft snl 1154 ft wel of 185.56-ac tr, or 5500 ft ewl 3350 ft snl, George Clapham sur, lcn for 8000-ft Travis Peak test.

Van Zandt County: Humble's Joe Surratt 1, 2100 ft fr ne 2225 ft fr nwl, F. W. Wrede sur, mile se Edgewood, rur for 8500-ft Travis Peak test.

NORTH TEXAS

Archer County: L. T. Burns et al's L. F. Wilson 5-P, 990 ft snl 450 ft wel ATNCL sec 115, lcn 5000-ft Ellenburger test.

Cooke County: Al G. Hill et al's A. C. May 1, 1500 ft w 330 ft s of ne cor of 341-ac tr, Alfred Johnson sur A-526, 2½ mi nw Coesfield, lcn 6500-ft Ellenburger test.

Montague County: C. H. Murdick et al's I. P. Matney 1, 330 ft out sw cor e½, W. E. Davis sur A-210, lcn Bend test.

Archer County: Consolidated Oil Co.-Premier Oil Ref. Co.'s Mrs. G. Garrett 1, 330 ft out nwc of e-225 ac, John Walker sur, A-676, spd 6000-ft Ellenburger test.

Fortex Oil Corp.'s S. Otto 1, 150 ft snl 2088 ft wel sec 69, blk 3, Clark-Plumb sur, lcn 1500-ft test.

Clay County: L. T. Burns et al's Bowen-Gulf 2, c nw se TE&L Co. sec 2641, lcn 3500-ft Strawn test.

Cooke County: Ray Bourland-Rogers Bros. & Roy Riner's R. M. Felty-R. W. True 1, 990 ft out nec, J. Davis sur A-331, lcn 2700-ft Ellenburger test.

Northern Ordnance's John Ware 1, 467 ft snl 1400 ft wel, Wm. Goodnight sur A-414, lcn 5000-ft test.

King County: Shamrock O&G Corp.'s R. B. Masterson 1, c sw ne sec 20, Jas. R. Johnson sur A-685, on 20,032-ac lse, lcn 5000-ft test.

Wichita County: W. A. Baber et al's J. F. Long 1, 2522 ft nsl 550 ft ewl (river), E. Morrison sur A-186, lcn 2500-ft test.

Young County: Standard of Texas-Hanlon & Buchanan's R. T. Wells 2, lse 1, 467 ft out sec TE&L Co. sec 738, lcn Ellenburger test.

Valley Osage Oil Co.'s M. Killian 1, 600 ft nsl 200 ft wel of w-80 of n-138 acres of TE&L sec 211, lcn 1050-ft test.

Houston Gulf Gas Would Sell Producing Properties

Houston Gulf Gas Company will sell its production properties, all in Texas, to Union Producing Company, and United Gas Pipe Line Company will take over transmission lines and other properties of Houston Gulf Gas Company, under a plan presented to Securities and Exchange Commission for approval. The sale and merger of these companies, subsidiaries of United Gas Corporation, is a move toward simplification of the corporate setup of Electric Power & Light Corporation, immediate parent of United Gas Corporation, it was explained.

Squeaks from the Bull Wheel

Regular

"Who was the blonde you were out with on Tuesday and Wednesday?"

"Believe it or not, that was the brunette I was out with on Saturday and Sunday."

As Measured

"My boss is an old Navy man."

"That so? What was his capacity?"

"Oh, about four or five quarts."

Well Trained

A woman at an amusement park gave her small son a dollar and, before turning him loose to his own devices, asked what he intended to do with it.

The lad announced his budget of taffy, ice cream cones, hot dogs, cotton candy and popcorn.

"Anything else?"

The well trained young man, recalling sundry dietary lessons, gulped a couple of times and added, "Yes, mama, a green vegetable!"

Instructions Followed

Man Instructor—"I am putting this rivet in the correct position; when I nod my head, hit it real hard with your hammer." She did. He woke up the next day in the hospital.

Deflated

Some of the young boys in uniform try hard to appear grown up and sophisticated. One of this type was in a night-club group recently. As a mature cabaret singer danced near his table he whistled and asked, "Hey babe, what you doin' after you get through here tonight?"

The singer looked at him compassionately. Leaning over tenderly, she said: "I'm going home to take care of my little boy, who is just about your age."

One-Way Climbers

"Say, Aunt Melissah, what am a para-trooper?"

"Well, Honey, a para-trooper am a soljer what climbs down trees he never clumb up.

Not the Word

"I understand your wife came from a fine old family."

"Came is hardly the word, she brought it with her."

Retort

The street-corner orator had been called on to answer more questions than he expected and he was becoming rather muddled.

"Tell them all you know," shouted a heckler during an awkward pause. "It won't take you long."

"I'll tell them all we both know," replied the orator, "and it won't take me any longer!"

Not in the Panhandle

Spending the night in an Amarillo hotel, a young woman tourist who, it was learned later, had two college degrees, engaged the desk clerk in conversation.

"What have you that is of unusual interest in your city?"

"Well, we have the only helium plant in the world for one thing."

"Really, and is it in bloom now?"

Sticks to His Bargain

As business was a bit dull in town, the carpet-sweeper salesman thought he'd try the wide open spaces. Presently he came to a remote cottage, at the door of which stood an extremely tough-looking man.

But when he began his sales talk the cottager interrupted him.

"Don't waste your breath. I've got a carpet-sweeper already."

"Good. Then I can make you a splendid allowance for your old sweeper in part payment for this new model."

"No, I won't. After all, I took 'er for better or wuss, didn't I?"

Hint

Billy, aged 4, came home from a neighbor's home with a handful of cookies.

"Have you been begging cookies from Mrs. Jones again?"

"I didn't beg for any. I just said: 'This house smells as if it was full of cookies, but what's that to me?' "

Changed

"By the way, who is that long and lank girl standing over there?"

"Hush. She used to be long and lank, but she's just inherited $100,000. She's tall and stately now."

Standco
NO-SMOKE
STANDCO BRAKE LINING
for the easiest brake known. It "feeds off" evenly. Standco never scores brake rims. See page 2808 Composite Catalog.
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909 Tulsa Loan Bldg.,
Tulsa 3, Okla.

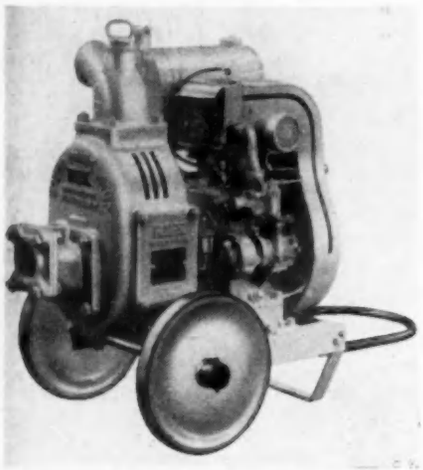
Notes for the Equipment Buyer and User

Portable Oil Field Pump

CHAIN BELT COMPANY

Chain Belt Company, Milwaukee, Wisconsin, announces the Rex Speed Prime Pump for oil-field use. Applications of this pump includes supplying water for drilling, handling drilling mud from rig to rig and from storage to rig, lifting oil from gathering lines to separators, removing waste oil from under rig floors, and de-watering fire-wall trenches.

This line of centrifugal self-priming pumps range in capacity from 3000 to 125,000 gallons per hour. Features of the pump include a patented air peeler which peels the air from the impeller when the pump is priming; "Z" metal which has maximum resistance to abrasion and corrosion; automatic governor which has variable speed control which enables the operator to regulate the speed of the pump to meet varying conditions.



Rex Speed Prime Pump

Why
THE INDUSTRY'S LEADING CENTRIFUGE?
3480
BECAUSE:
Heavy duty, ruggedly constructed and extremely simple in design . . . Gets quick, accurate results . . . produces required speed with less effort . . . Cranks and heads of 100 CC and 15 CC size machines interchangeable . . . Meets A.S.T.M. Standard Method D-96 and A.P.I. Code No. 25 requirements.
W·H·CURTIN & CO.
Inc.
HOUSTON U·S·A TEXAS

Hydraulic Puller

TEMPLETON, KENLY & COMPANY

Templeton, Kenly & Company, 1020 South Central Avenue, Chicago 44, Illinois, announces the Simplex Jenny Center-Hole Hydraulic Puller for use in speeding up maintenance and repair jobs.

Applications include pulling bushings, cylinder liners, cutless bearings, pistons, wrist pins, valve seats, keys, wheels, sprockets, gears, boiler tubes and pipes. It is also used to pull structural members together for welding and riveting. In oil field work, the unit has been found especially useful.

The Jenny pulls, pushes or lifts, and can also be rigged up as a portable press. It is self-contained and operates vertically or horizontally without the need for heavy auxiliary equipment.

Simplex Hydraulic Puller pulling valve seat from slush pump

Light

FOCAL COMPANY

Focal Company, P. O. Box 31, Downey, California, announces an all-purpose focal beam hand light of wide application.

Constructed of Tenite Number 11, a plastic material of unusual strength and durability, minimum weight has been achieved. The range of light is from a strong flood-light to a highly intense focal beam of 2500 feet. A utility light is incorporated in the handle of the lamp. A four-foot extension cord is provided to make possible close inspection of otherwise inaccessible places.

Focal-Lite

The entire unit is self-contained, the light being furnished by six 1½-volt batteries in the base of the case. The range of voltage may be changed from 3 to 9 volts by use of a movable switch contact arm.

Rope

Plymouth Cordage Company has published War Emergency Service Book No. 4, both as a helpful service to the war effort and to distributors, dealers and users of rope.

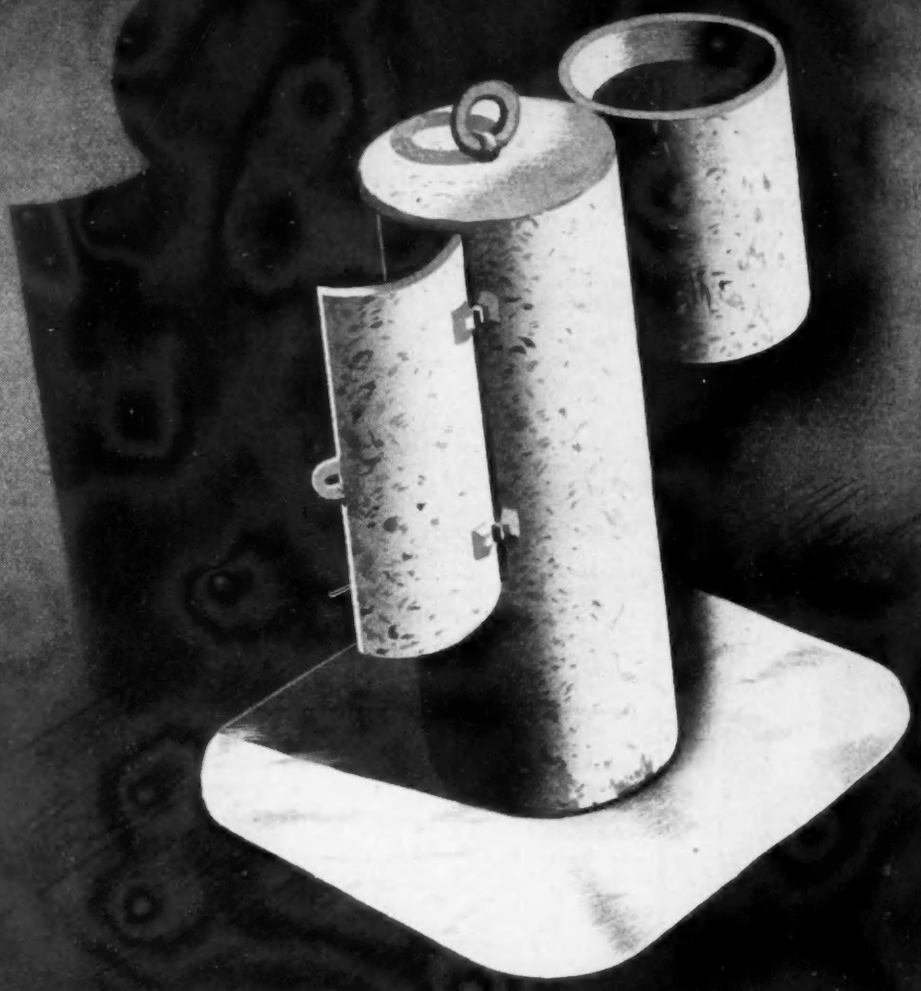
Electronic Control

General Electric Company, Schenectady, New York, has issued a booklet discussing fundamentals and applications of electronic control.

Well illustrated, the publication explains in clear, simplified language the fundamental principles of electronic tubes and their operation, describes the construction of the well-known thyratron tube, and lists the functions of eight of the more widely used industrial-type tubes.

The publication also describes and illustrates many practical applications of electronic control, including rectification, resistance welding, timing, and processing operations, as well as photoelectric installations involving counting, sorting, weighing, measuring, registering, illumination, and the control of cement kiln temperatures. Many of these applications have been in

Wartime Conservation – Testing Equipment



Information supplied by "The Oil Weekly"

Laboratory and field testing equipment, once no farther away than the nearest supply company branch, now can be replaced only with great difficulty and then only after long and expensive delays.

Close control of drilling mud characteristics, so essential to control of subsurface pressures, is possible only through continued testing of samples from the pits and mud-return stream. Testers, hydrometers and other equipment must be safeguarded against accidental breakage, including possible jet of escaping high-pressure mud or wash-down hose.

A steel case, basically a cylinder of heavy casing with footing of tank plate, serves to protect the equipment between tests, and as working space during the runs. A door, the closure carried on hinges improvised from drilling chain links, carries a shelf on which the graduate may be set for running viscosity tests, while a second and smaller cylinder, welded to the main unit near its top, serves as a container for clear water for flushing out the funnel and cleaning the scale of the hydrometer.

A heavy eye, welded at the top, permits cat-line shifting of the unit to most advantageous site for more rapid running of tests.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.

ARMY E NAVY

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MOLY

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VS.
WING VALVES

The **ORBIT VENTURI TYPE VALVE** is manufactured with Stellite "J" Metal Seats which will not only withstand the abrasion of sand but is also corrosion resistant to all types of crude oil.

Orbit Venturi Type Valve

This valve can be furnished thru all fabricators of Xmas Trees or thru any of your local supply stores at a price comparable to that of leading plug valves **YET** this valve requires no lubrication to effect a seal.

See Pages 2194 to 2211 in 1944 Composite Catalog

Specify

ORBIT VALVES

OIL WELL IMPROVEMENTS COMPANY

TULSA **OKLAHOMA**

successful operation for a decade or more.

Also listed in the publication are the various advantages afforded by the use of electronic control.

Decker Tool and Industrial Supply Companies Consolidate

A consolidation between the Decker Tool & Supply Company and the Industrial Supply Company of Wichita Falls, Texas, has been announced. Jerry Vinson and Everett McCullough, principal owners, and Marvin McCullough, general manager of Industrial Supply Company, will direct affairs of the consolidated firms following retirement of H. A. Decker who is to remain active for a time. The same personnel will be retained in all of the Decker branch stores.

PARKE HOLBERT, formerly with Tidewest Oil Company's production department for ten years in Oklahoma and Kansas and, after leaving that company, developing and operating his own properties, has joined the sales force of Lufkin Foundry & Machine Company as engineer in charge of West Texas with offices in Odessa.

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- Throws bright beam 1500 feet.
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